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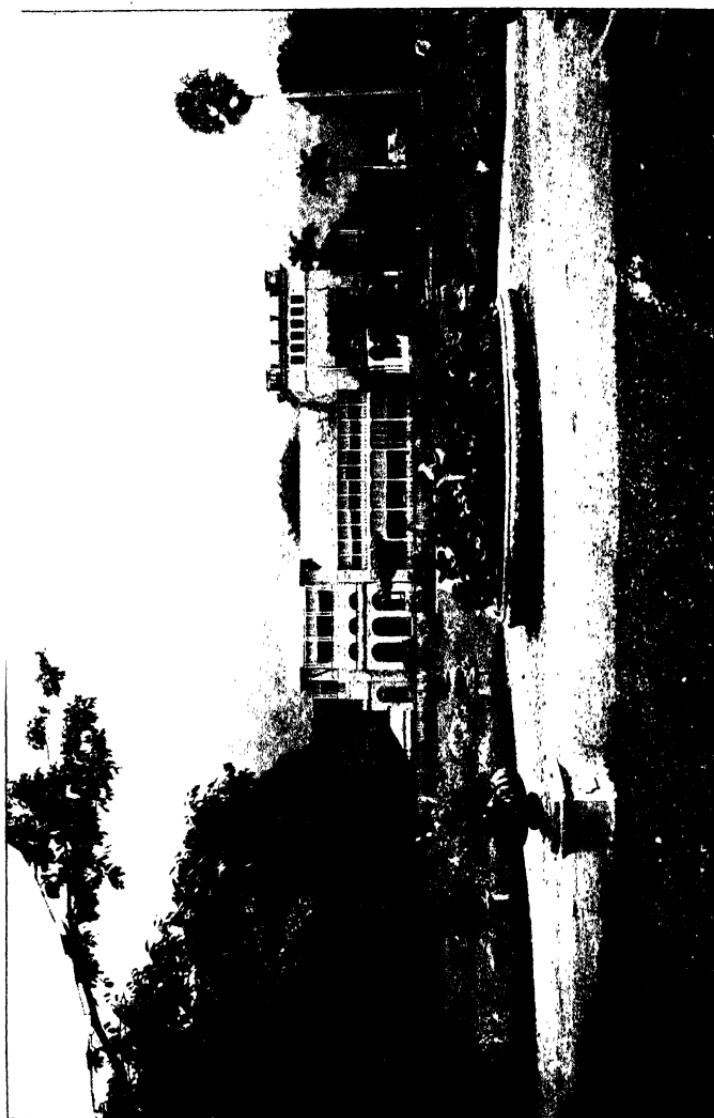
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NOTICE TO BINDER.

Volume *XLIX.* has been issued in two parts, each containing the "Journal" proper, paged with Arabic figures, and "Extracts from the Proceedings" paged with Roman figures. This title and contents sheet should be placed first, and be followed by pages 1 to 138, then by pages 139 to 304. After that should come "Extracts from the Proceedings," pages i to lxx, lxxi to cxvii, concluding with the General Index.

[To face p. 1.

FIG. 1.—THE FLOWER GARDEN AT GOVERNMENT HOUSE, TRINIDAD.



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THE TROPICAL FLOWER GARDEN.

By R. O. WILLIAMS, Superintendent, Royal Botanic Gardens,
Trinidad.

THE following paper is based on West Indian experience, gained chiefly in Trinidad, where climatic conditions are such as to give a maximum shade temperature of 85° to 87° F. and a minimum of 69° to 70°; little variation occurs throughout the year. The rainfall averages, roughly, 70 inches per annum, the year being divided into two seasons, the wet and the dry. The dry season lasts from January to May, and during this period light showers only with occasional droughts are experienced; the wet season lasts from June to December. The flower garden of the Royal Botanic Gardens, Trinidad, is situated at about 130 feet above sea level.

General.

To those unfamiliar with the tropics the bare mention of the word usually conjures up ideas of untold wonders in the plant world, and those who have the good fortune to live in or visit the tropics know what wealth and variety of plants are to be seen. Some are native and others have been introduced from various parts of the world. To mention trees producing large, gorgeous flowers, rampant climbers often highly decorative, graceful and stately palms, gigantic tree ferns, beautiful aroids and flowering shrubs, is to enumerate but a few of the chief groups.

Despite the wide range of subjects suitable to tropical conditions of cultivation, the establishment and maintenance of a flower garden usually presents greater difficulties than in England, and a properly designed and well-cared-for flower garden is rather an exception, although many beautiful arboreal gardens may be seen. More often than not the flower garden is represented by a tangled mass of shrubs, annuals, and climbers growing in bewildering confusion.

The enthusiastic gardener in the tropics often fails because of a wrong choice of garden subjects or inadequate knowledge of their growth. He often attempts to grow plants with which he has succeeded under totally different climatic conditions. Whilst such attempts are useful and need all encouragement, they should be made within reason or with due regard to the different conditions and environment which will influence the plants.

In the first instance it is wise to plant in the flower garden only those subjects which from local trials have been known to succeed, and to treat all new introductions on a purely experimental basis in an area especially reserved for them; they should not be put into the flower garden till their usefulness has been proved. The same advice may be given for wild plants. These require strict selection and trial under conditions of garden cultivation before they are admitted to a place in the general plan of the flower garden.

From this it should not be gathered that there is a scarcity of subjects for the tropical flower garden. There is ample material for it, but the planting has to be developed to a large extent upon lines different from those to which one is accustomed under temperate conditions of climate. Flowering shrubs, of which there is a large selection suitable for tropical conditions, have to be utilized to a much greater extent than is customary in English gardens, and if annuals are used constant provision has to be made for their replacement, because their period of growth and flowering is usually comparatively short. Most bulbous and herbaceous perennial plants which beautify English gardens will not thrive under tropical conditions, and the summer annuals which will grow well are somewhat limited in number.

Planning.

The planning of the flower garden should usually be done on the simplest lines, and roads and walks should be made part of an harmonious scheme. Pretty flower gardens are sometimes spoilt by having the roads or paths formed of concrete or asphalt. The idea is good, as it serves the double purpose of controlling weeds and making dry paths during the wet season, but the general effect is far from pleasing to the eye. Well-drained walks nicely gravelled are far more suitable.

It is wise to make all the beds of the simplest form, as owing to the rapidity with which the grass grows and the consequent necessity for frequent trimming the edges soon become spoilt by the unskilled

labourer often employed to do the work. Elaborate bedding designs are not suitable in tropical conditions of gardening.

Small round beds with a diameter of about ten feet are a suitable size for most of the smaller growing plants, whilst for larger ones such as Cannas fifteen or twenty feet is a better size. Rectangular beds are of convenient width at six feet, as during wet weather weeding can then be done from all sides of the bed with comparative ease.

Arrangement.

Under tropical conditions of gardening judicious arrangement of the plants grown is even more necessary than under temperate conditions, growth being so rapid that unless rightly placed the various plants soon grow out of all proportion to one another.

Annuals are usually planted in beds of one variety, of either selected or mixed colours according to taste. There are few annuals really suitable for showy flower beds; on this account, and because of the adverse conditions of the wet season, only a limited number of beds should be reserved for them.

For permanent or semi-permanent beds Plumbago, Galphimia, and Hibiscus are suitable if they are so spaced as to leave pockets in which annuals or rarer plants may be planted.

As an example of the arrangement of a tropical flower garden the following particulars of that of the Royal Botanic Gardens, Trinidad, are given.

On either side of a broad central walk and at right angles to the southern aspect of Government House are ranged three rows of flower beds widely spaced on closely-mown lawns. The row nearest the walk is composed of a round bed 10 feet in diameter and several rectangular ones about 20 feet by 6. At its northern end the walk broadens into a circle some 30 feet in diameter, in the centre of which is a tree of *Solanum macranthum*. Around the circle is a border 6 feet wide divided in several places by paths leading from it. The border is partly planted with Plumbago, amongst which small annuals are grown, and partly with *Clerodendron fallax*. The rectangular beds are kept filled with the larger growing annuals, Zinnias, Marigolds, Cosmea, Argemone, etc., or perennials such as Michaelmas Daisies, *Salvia splendens*, *Scutellaria*, etc.

The beds in the second row are circular in shape and are about 18 feet in diameter. They are usually kept filled with the best varieties of Cannas, which ensure a stock of flowers in the garden at all times. The third row is also composed of large beds, which are utilized for the larger flowering shrubs, such as Queen of Flowers (*Lagerstroemia indica*), Ixoras, Oleanders, etc., around which smaller shrubs, perennials or annuals are planted.

South of the central main walk a short winding path leads to the bandstand. On one side are small circular beds, in the centre of which are plants of pink or red double Hibiscus trained as standards.

These, besides being very effective themselves, form useful protection for such small subjects as Verbena, Myosotis, Dianthus, etc., which are planted beneath their shade. On the opposite side of the walk is a Maltese-cross bed, which is usually reserved for annuals, and a few round beds, in the centre of which are planted various shrubs surrounded by smaller plants and pillars over which Corallitas ramble.

At right angles to, and on either side of, the main walk are more small round beds, a few of which are of Roses, interplanted with *Phlox Drummondii*, Dianthus, Balsams, etc., whilst others are reserved for annuals or such plants as are available from time to time. As a setting to the scheme, a border some 20 feet wide is planted under the balustrade which runs the whole length of Government House. This is filled with different varieties of Hibiscus; the varieties of *H. mutabilis*, the changeable Rose, forming the background; all the better kinds of *H. rosa-sinensis* in the centre; and as a front border *Coreopsis grandiflora*. Marigolds, Zinnias, Vincas and similar small plants are utilized as undergrowth from time to time.

In the past the border has been alternately used as a Croton border in which numerous varieties of this beautiful foliage plant were planted, and as a mixed foliage and flower border.

Flower Borders.

Permanent flowers are somewhat difficult to plan, and I can only give some idea of the plants useful and their respective positions, leaving the arrangement to the discretion of the planter. Careful attention must be paid to pruning so as to maintain the general symmetry of the border.

As a back row the following are suitable : Hibiscus, Poinsettia, *Caesalpinia pulcherrima*, *Duranta Plumieri*, *Thrysanolaena argrostis*, *Lagerstroemia indica*, Acalypha, Oleander, Plumeria, Tabernaemontana, Dracaenas, Crotons, etc.

The middle row may consist of Clerodendron, Ixoras, Pampas grass, Jatropha, Gardenia, Holmskioldia, Lantana, Portlandia, Russelia, *Tecoma capensis*, Crotons, Dracaenas, Eranthemum, *Graptophyllum*, Strobilanthes, etc.

For a front row there are Plumbago, Barleria, Galphimias, Pentas, etc.

For edging plants, Alternanthera, Violets, *Rhoea discolor*, etc., are available.

Successional Planting.

At no time of the year is there a period of rest in the tropical flower garden, and it is necessary to keep a succession of plants in stock to replenish beds which have finished flowering.

The dry season is the best for most annuals, and the first seeds of these should be sown during the month of December by way of preparation for it. Many of them go through the complete cycle of their

growth in three or at the most four months, consequently a large and varied stock of young plants is constantly required. It is generally best to arrange that all beds in the garden are not planted at the same time, but in such rotation that the planting will provide for a succession of flowers throughout the year.

Annuals.

The many varieties of *Zinnia elegans* do well at all times of the year, and are annuals which can be relied upon, provided seeds be imported from reliable nurserymen. They produce an abundance of seed in the West Indies but deteriorate considerably even in the first generation. The first flower bud should not be allowed to develop, and the plants will last longer in flower if the seeds are not allowed to ripen.

The African Marigolds are suitable for growing throughout the year, but the French varieties only during the dry season ; during the wet season the latter varieties make a profusion of growth but few flowers. Marigolds can be raised true to type from seed grown in the tropics.

Amaranthus tricolor, which develops terminal heads of leaves of a variety of colours, is suitable for cultivation in the dry season but is very subject to caterpillar attack. *Amaranthus caudatus*, the well-known Love-lies-Bleeding, may be grown at any season of the year.

The white variety of *Argemone mexicana*, the Mexican Poppy, is especially suitable for large beds. It is an annual plant with pretty grey-green leaves, somewhat spiny in character, and large single white flowers with yellow centres.

Of the varieties of Celosias, the giant forms succeed better than do the dwarf.

All varieties of garden Balsams, *Impatiens Balsamina*, either single or double, will grow at both seasons of the year, and they may be used either for small beds or as a groundwork in combination with shrubs. The varieties of *Impatiens Holstii* will not stand the same amount of sun and dry weather as the garden Balsams, so they are of the greatest use for bedding purposes during the wet season. Owing to the variation in colour, selection is necessary, but once established in the garden the plants grow so vigorously that selection presents no difficulties.

Phlox Drummondii are very useful for bedding purposes, and so are Verbenas ; however, neither is worth growing during the heavy rains.

The West Indian Pansy (*Torenia*), of which there are several forms, is a small plant very useful for tiny beds or edging purposes during the wet season.

Petunias are favourite bedding plants in the West Indies, and are also grown to a large extent in pots or ornamental vases. For general bedding purposes the single varieties are the hardiest, but fine specimens of the double forms can also be grown. They are useful on

account of their brilliant flowers and because they occupy the beds for a longer period than many other annuals.

Gomphrena globosa is known as the Bachelor's Button. It is an annual plant 12 to 18 inches high with globular flower heads, the common varieties being either of a pure white or purple colour. Bachelor's Buttons can always be relied upon to make showy, uniform beds at any season of the year.

Gynandropsis speciosa makes sturdy little bushes with terminal heads of mauve-shaded flowers. Unfortunately, they do not long remain in flower.

All the annual Coreopsis may be grown during the dry season, the best for bedding purposes being *C. tinctoria* and *C. Drummondii*.

Roses.

The Rose is the most popular flower here as in other parts of the world, but under West Indian climatic conditions few varieties with the exception of the teas and hybrid teas will flower. These latter varieties produce a few flowers practically throughout the year, but are more prolific about the commencement of the rainy season.

Experience has shown that Roses do better on their own roots than when budded on to other stocks. Owing to the constant high temperature there is no cessation of growth, and there is consequently no set period for pruning. If the blooms are cut with long stalks and all old flowers removed in the same way, it will be found that there is little need for pruning.

In the West Indies the Rose is essentially a flower more suitable for cutting than for use as a bedding plant, and this point should be borne in mind when selecting a site for planting. Roses are not suitable for massed colour effect to the same extent as in English gardens, owing to the restricted production of flowers.

Bulbous and Tuberous Rooted Plants.

Of bulbous and tuberous rooted plants there is not a great variety. Dahlias can be grown from imported tubers, but rapidly deteriorate under tropical conditions. Zephyranthes, locally known as Crocuses, which they somewhat resemble, are grown in three colours—pink, white and yellow.

The Tuberose (*Polianthes tuberosa*) is admired for its erect spike of creamy, sweetly-scented flowers. Amaryllis does remarkably well, so do Pancratiums and some of the Crinums.

Perennials and Shrubs.

Under this heading are included the majority of plants most suitable for the tropical flower garden, and it is only possible within the scope of this paper to mention a few of them.

Angelonia salicariaefolia is a small plant about 2 feet in height. There are two varieties, one with white and the other with violet flowers.

Michaelmas Daisies make good plants for beds, and flower throughout the year.

Of Begonias there are numerous species and varieties suitable for cultivation. The tuberous-rooted varieties are unsuitable for the tropics, but *B. semperflorens* makes a good bedder. The larger growing fibrous-rooted Begonias mostly require to be grown in shade or semi-shade, although *B. coccinea* with its bamboo-like stems, and 'Pres. Carnot' to some extent, will stand exposure to the sun.

Cannas form one of the most useful subjects, and provided they be planted in heavily manured beds they will flower well. Owing to the rapidity of their growth they require planting about twice a year, when the root-stocks should be divided. After flowering every individual shoot should be cut back close to the ground, when others will rapidly replace it.

As wet-season subjects for foliage effects, Coleus are extremely useful. They can be easily propagated from cuttings and grow rapidly. Stock plants should be preserved in a moist, shady place during the dry season. Iresine may also be utilized in the same way.

Zonal Pelargoniums do not like the moist conditions of climate, and although they can be grown during the dry season, conditions are not really suitable for making them successful bedders.

Heliotrope can be grown to perfection, as can also several species of Salvia, the most useful of which is *Salvia splendens*.

Plumbago capensis is a most useful and pretty small shrub throughout the year, but it is prettiest during the dry weather. After rain the flowers look very bedraggled. The plants require pruning about twice a year, when all old shoots should be cut out close to the ground.

The varieties of *Hibiscus rosa-sinensis* make a very popular group of plant owing to their wide range of colour, size of flowers, etc. The double forms can be trained to form standards, but most of the single forms are unsuitable for that purpose. They are useful for large beds and borders and may be mixed with other plants in small beds.

The conditions for the growth of Poinsettias (*Euphorbia pulcherrima*) are ideal. These plants grow to a height of 8 or 10 feet, and produce their brilliant bracts towards the close of the year. The single variety produces its bracts first, and is followed later by the double form, which is more showy and remains in perfection for a longer period than the single form.

Clerodendron fallax is a very rapid grower, being easily raised from seed, and growing to a height of 5 or 6 feet. It produces large velvety leaves and large spreading panicles of bright scarlet flowers. It flowers for a long time and is very suitable for large beds and borders. It may be cut back after flowering and will then soon flower again.

Caesalpinia pulcherrima, the 'Barbados Pride,' grows to a height of 12 or 15 feet and produces brilliant red or yellow flowers.

Lagerstroemia indica, the 'Queen of Flowers,' is very similar in habit. There are several varieties with beautiful pink, white, or crimson flowers. Both the latter shrubs require to be cut hard back after flowering.

A pretty berried shrub is *Duranta Plumieri*; the flowers are small, either white or purplish, succeeded by currant-like strings of orange-coloured berries. These are borne in great abundance throughout the year.

Portlandia grandiflora grows well under the somewhat dry conditions found in Barbados, but in Trinidad it is not easy to establish. It is a showy shrub with large white flowers.

There are several species of Russelia, sometimes called Antigua Heath. They grow to a height of a few feet, and produce drooping branches and small scarlet flowers. They are most useful for covering bare banks or sides of walks, and are interesting in Trinidad on account of the great attraction the flowers possess for humming-birds.

Many kinds of Ixoras may be grown, from the smaller *Ixora coccinea* and *I. lutea*, suitable for small bedding plants, to the larger *I. parviflora*, a shrub 10 to 20 feet high, white with highly fragrant flowers.

Where quick foliage effects are required, Acalyphas, Eranthemums, Graptophyllums and Strobilanthes grow very rapidly and are very rich in colour.

Hedges.

The commonest hedge plant is the red form of *Hibiscus rosa-sinensis*, and this may be trimmed to form a very neat, compact hedge, or, if close trimming is not desired, it may occasionally be allowed to burst into flower with brilliant effect. Several species of Aralia are also good, either as ornamental hedges or for shelter from wind.

For small ornamental hedges *Eranthemum Eldorado*, a small shrub with variegated yellow foliage, is very pretty; *Barleria cristata* also makes a small pretty flowering plant for the same purpose. Neither of the two latter, however, is as permanent as the sweet-scented *Murraya exotica*, known under such varying names as Limonia, China Box, and Citronella.

All these are readily propagated by cuttings which may be planted direct in the situation where they are required, preferably at the commencement of the rainy season.

Pergolas.

There are so many beautiful climbing plants in the tropics that the difficulty is usually in selection. For the flower garden it is better to use the smaller ones; the stronger are better placed where they can ramble over tall trees or buildings.

Bougainvillaeas are amongst the most gorgeous of climbers. Of these there are several species with brilliant crimson, purple, or brick-red coloured bracts. The two former are very good for arches, but the

latter requires a tree. As an example of the adaptability of the crimson Bougainvillaea, it may be stated that a few plants were once placed in a bed in Government House grounds, Grenada, where they were kept tied and trained to wires fixed crosswise above the bed at about 18 inches from the ground. Six months later, at the time of the visit of H.R.H. the Prince of Wales, they were a gorgeous mass of flowers.

Antigonon leptopus, the Corallita, cannot easily be equalled as a pretty flowering climber: there are pink and white varieties. They will cover an arbour quickly and flower during most of the year. When they become untidy they may be cut down close to the ground, after which they will quickly grow and flower again.

Two of the most rapidly growing climbers for protecting the gallery of a house are the Elephant Creeper (*Argyreia speciosa*) and the Corallila (*Porana paniculata*). The former has large leaves, silvery beneath, and bell-shaped purple flowers, whilst the latter bears large panicles of small white flowers towards the close of the year.

Honeysuckle grows fairly well and is most suited for a small arch, as its growth is not particularly strong or rapid.

Where foliage plants are required several of the climbing species of Asparagus, principally *A. plumosus*, may be utilized.

Other useful climbers are Stephanotis, Solanum, Camoensia, Tecoma and Thunbergias.

THE GARDEN POLYANTHUS: ITS ORIGIN AND HISTORY.

By MILLER CHRISTY, F.L.S.

THE genealogy of the Garden Auricula has been studied with care and written upon exhaustively. There is little to be said about it that has not been said already by numerous writers, many of them first-rate as authorities on such a subject.* From the evidence adduced by these writers, it appears that the Garden Auricula was brought into cultivation on the Continent early in the sixteenth century. Thence it was probably introduced into this country, about the middle of that century, by refugees from the Low Countries, and its cultivation here has been extremely popular ever since. It is a plant of garden origin, unknown in a state of nature, and apparently of very mixed descent—probably a hybrid between the two Alpine plants, *Primula auricula* and *P. pubescens*, or some of their varieties or hybrids.†

The case is, however, very different with another of our familiar garden flowers which is closely associated with the Auricula in the minds of most people—namely, the Garden Polyanthus. The origin and history of this very common and very handsome plant have not altogether escaped investigation; but, so far as I am aware, no one has yet taken the subject in hand seriously and shown conclusively what is the genetic history of the plant, what its relationship to its nearest allies, and how and when it came to be cultivated in our gardens.

Yet, to us in Britain, the Polyanthus should be of far greater interest than the Auricula; for, as will be shown hereafter, it is a product of our own country, and its natural progenitors did not come (as did those of the Auricula) from the high Alps or any far-distant country, but from Britain alone, and it has been, for a long period, something more than a garden favourite with us. As a garden-enthusiast wrote, just a century ago:‡

The Polyanthus . . . may justly dispute the prize of Beauty with any European flower, when we take into account the variety and richness

* See, for example, James Maddock, *Florist's Directory*, pp. 10–11 (1792); the Hon. and Rev. William Herbert, *Trans. Hort. Soc.*, iii. (1820) pp. 357–358, and iv. (1822) p. 19; George W. Johnson, *Hist. of Eng. Gardening*, p. 359 (1829); John Slater, *The Auricula* (*Gardener's Monthly Volume*, 1847); Prof. Anton Kerner, *Zeitschr. des Deutsch. und Oesterl. Alpenvereins*, vi. (1875) pp. 39–65 (also, separately, Innsbruck, 1875); Alfred W. Bennett, *Gard. Chron.*, n.s., iv. (1875) p. 806 (a summary of Kerner's article); John Gilbert Baker, *Gard. Chron.*, n.s., xxii. (1885) pp. 757–758; Shirley Hibberd, *Journal R.H.S.*, vii. (1886) pp. 191–208; G. C. Churchill, *Gard. Chron.*, n.s., xxv. (1886) pp. 563–564; and James Douglas, in *Rep. Third Internat. Conf. on Genetics*, pp. 435–437 (*Roy. Hort. Soc.*, 1906).

† *Primula pubescens* is probably itself a hybrid.

‡ H. Phillips, *Flora Historica*, i. (1824) pp. 57–58.

THE GARDEN POLYANTHUS : ITS ORIGIN AND HISTORY. II

of its colouring, the grace and elegance of its form, [and] its mild and agreeable odour that has never been known to offend. Its easy propagation, hardy nature, and early time of flowering, make it a welcome inmate in every flower garden ; and in no part of the world is it so successfully cultivated as in England, particularly by the zealous florists of Lancashire and Cheshire. . . . The neighbourhood of Manchester and Macclesfield is justly celebrated for producing the finest specimens.

Yet, as has been said, the history of this wonderful plant has never yet been adequately set forth. In what follows, I have endeavoured to supply this deficiency.

First, as to the plant's name ; for, in this matter, as in so many others, terminological exactitude is of prime importance.

The word *Polyanthus* is a comparatively-modern latinization of an earlier form, *Polyanthos*, derived from the Greek πολύ, many or much, and ἄνθος, flower (or flowers), literally many-flowered. All the earlier herbalists who made use of the word at all spelt it in this way.* It should be noted, however, that these used the word in *an adjectival sense* only, as indicating many-flowered. Thus they spoke of a "polyanthos Primrose," meaning any Primrose (or, as we should now say, any *Primula*) with an umbellate inflorescence.† Moreover, they did not even apply the term exclusively to members of the genus *Primula* ; for, as an adjective, it is, of course, equally applicable to any plant which has an umbellate or other many-flowered inflorescence. We still use the word in this sense when we speak of a 'Polyanthus Narcissus' or a 'Polyantha Rose.' It was not until the first half of the eighteenth century that the word came to be used *as a noun* and employed exclusively as the distinctive name of a particular plant—namely, that cultivated *Primula* we now call the *Polyanthus*. Most of those who wrote on gardens and gardening at the period indicated used the word in this sense, though they still spelt it *Polyanthos*, in the old and strictly-correct way.‡ After about the middle of the century, however, we meet with the word almost invariably in its modern latinized form of *Polyanthus*.

Next, as to the history of the *Polyanthus* ; for it will be convenient (if not altogether logical) to notice this before treating of its origin.

There is a general belief that the *Polyanthus* has been in cultivation for a very long period. Thus one authority, which is generally reliable, asserts that it is "one of those plants which have, from time immemorial, been favourites in gardens."§ Another, which ought to be reliable, says it is "one of the oldest of the florists' flowers."||

* See, for instance, Parkinson, *Paradisus Terrestris*, p. 244 (1629).

† Morison speaks (*Plantarum Hist. Univ. Oxoniensis*, ii. (1680) p. 554) of the various single-flowered *Primroses* as 'monanthos' *Primulas*, but the term has never been used generally.

‡ See, for instance, Richard Bradley, F.R.S., *New Improvements in Gardening*, second edition, p. 196 (1718) ; Sir Thomas More, Bt., *The Flower Garden Displayed* (1734) ; and "Sir" John Hill, *Eden*, p. 157 (1757).

§ *The Penny Cyclopædia*, xvii. (1840) p. 247.

|| *Ency. Brit.*, xxii. (1911) p. 17.

These statements appear, however, to be quite incorrect. I have searched carefully the writings of all the earlier herbalists without being able to satisfy myself that the plant we now know as the Polyanthus was known to any of them. For instance, I can find no mention of any plant which seems to be identical with it in the works of Fuchs (1542), Turner (1551 and 1562), Dodoens (1554), Matthiolus (1563), Lyte (1578), de l'Obel (1581), d'Alechamps (1587), Bauhin (1596), Gerard (1597), Clusius (1601), or Parkinson (1629 and 1640).

At the same time, one is obliged to admit that this is, for several reasons, not entirely conclusive. In the first place, it is often quite impossible to make out with anything approaching certainty what particular species, variety, or hybrid these old writers were describing, or attempting to describe, when dealing with any member of the genus *Primula*. They knew little or nothing of the true natural relationships of the various forms they had before them, and they were puzzled by, and quite unable to understand, the results of the hybridization which takes place so readily between the various species. Moreover, owing to this ignorance, the nomenclature they employed was so vague that one can now only infer from it what particular form any one of them desired to describe in any particular case. The early Continental writers all employed the cumbersome, descriptive, Latin names which were in vogue in their day, but convey little to us now. As for English writers, when they did speak simply of 'Cowslips,' 'Oxlips' or 'Primroses,' it is quite certain that, in many cases, they did not mean what we now mean by those terms, and it is generally impossible to make certain exactly what they did mean. In some cases the rude woodcut figures they gave afford more or less guidance; but, even so, some doubt generally remains. Allowing for all these difficulties, however, I can reach no other conclusion, after searching the works of all the earlier herbalists, than that, up to about the middle of the seventeenth century, none of them was acquainted with the plant we now know as the 'Garden Polyanthus.'

There is evidence, however, that such a plant was in cultivation in English gardens very soon after the time indicated—that is, about a century after the Auricula was first cultivated here.

One John Rea, who wrote in 1665, throws interesting light on this point: "Primroses and Cowslips [he says] are English flowers. . . . We have now other kinds of Primroses and Cowslips that bear diversities of red flowers [which are] more esteemed than those of our own country."* He then proceeds to describe these various new sorts:

The red Primrose is of a newer date, more beauty, and greater variety [than the older sort]. . . . The tops of the shoots and bottomes of the stalks are of a reddish colour, but the greatest difference is in the colours of the flowers, there being almost twenty diversities of reds, some deeper and others lighter, from bloud-red to pale-pink colour; some are of a bluish rose colour, sader and paler; some dove colour; others of the colour of an old buff coat; and some hair colour. The scarlet [is the] rarest of all.

* *Flora*, p. 156 (1665).

After noticing the "variable scarlet or orange-coloured Cowslip," he continues :

The red Cowslip or Oxlip is also of several sorts, all of them bearing many flowers on one stalk, in fashion like those of the field, but of several red colours; some deeper, others lighter; some bigger, like Oxlips; others smaller, like Cowslips. Of some of these sorts, a multitude have been and are yearly raised from seeds, still sowed in hope of gaining new varieties.*

Some twenty years later, Randle Holme wrote to much the same effect :

The Paigle is [he says] a double Cowslip, of a purple colour, gold colour, or a yellowish green; some variable, of a fine orange colour towards the bottom, edged with cinnamon colour, and red on the outside; some the like with scarlet. The Oxlip Cowslip is like those of the field, but of several red colours; some deeper, others lighter; some bigger, others smaller.†

The larger coloured 'Cowslips' and 'Oxlips' mentioned by these two writers appear to have been true Polyanthus as we understand the term.‡

The available evidence goes to show, however, that after the first appearance of the Polyanthus in cultivation its development proceeded slowly, and that a considerable time elapsed before it attained the perfection of development and widespread popularity it reached later. Thus William Salmon, writing in 1711, gives no clear indication that he even knew it, though he describes twelve other kinds of cultivated Primula.§ It is similarly ignored by Richard Bradley, who wrote a year or two later. True, he has a passage headed "Of the Polyanthos"; but, of the various kinds of Primula he notices,|| none seems to be the kind we now know by that name. The kind to which he specially applies the term seems, judging from what he says, to have been merely a coloured double form of the common Cowslip.¶

Yet, even at this time, a Polyanthus "boom" had begun in England, and this continued to rage for at least half a century. In 1728 Thomson the poet wrote of "The Polyanthus of unnumber'd dyes," ** showing that it had already undergone marked development. In 1731 it was clearly well known to Philip Miller, who then

* *Flora*, p. 157.

† *Academy of Armory*, p. 70 (1688).

‡ Yet Robert Morison, writing as late as 1680 (*Plant. Hist. Univ. Oxon.*, ii. pp. 554-555), appears not to mention any such plant.

§ *English Herbal*, pp. 224-226 (1711).

|| *New Improvements of Planting and Gardening*, second edition, pp. 96-98 (1718).

¶ Such a form of the ordinary yellow Cowslip had long been in cultivation in English gardens. De l'Obel, in 1581, figured (*Plant. seu Stirp. Icones*, p. 567) what he described as "*Primula hortensis Anglica omnium maxima et serotina floribus plenis*," and Gerard, who wrote in 1597, called it (*Herbal*, p. 636) "*Primula hortensis Anglica*: Double Paigles." It was then, he says, "so commonly knowne that it needeth no description"; yet he gives (p. 637) an illustration of it, taken from some earlier herbal. It has now, unfortunately, almost disappeared from cultivation, though occasionally it reappears spontaneously. John Mortimer, F.R.S., says of it and similar garden forms of *Primula* (*Art of Husbandry*, ii. (1712) p. 176): "These flowers must often change their earth, or they will degenerate and become single."

** *The Seasons: Spring*.

wrote of it as "*Primula veris hortensis umbellata caule et flore folioso, coccineo majore*: Garden Primrose or Polyanthus, with large red flower." * Nearly thirty years later, the same writer testified to the development the flower had undergone, and the extreme popularity it had achieved. He speaks of the various sorts of Polyanthus,

which have been so much improved within the last fifty years as to almost equal the variety of the Auriculas; and, in some parts of England, they are so much esteemed as to sell for a guinea a root; so that there may be still a much greater variety raised, as there are so many persons engaged in the culture of this flower.†

This statement by Miller that the flower had been "much improved within the last fifty years" (say, since 1709) affords further evidence that, at the beginning of the eighteenth century, the Polyanthus was comparatively new in cultivation and was still largely undeveloped and little known.

It was not, however, until the Art of Printing had been so far perfected that it became possible to print *in colour* really good illustrations of flowers that we are able to gather a clear idea of the appearance of these early forms of the Polyanthus.

Probably the earliest coloured illustrations of the plant ever published appeared in 1734.‡ in a work with which Sir Thomas More, Bt., had some connexion, probably as part-author. This work contains twelve coloured copper-plate engravings, after drawings by Furber and others, representing groups or bouquets of flowers, one group for each month, with descriptive letterpress. As representations of flowers these illustrations are extremely poor, for they are on a small scale and the various flowers are much crowded together. Unfortunately, too, the letterpress (at least those parts referring to the Polyanthus) is largely at variance from the illustrations. Still, these latter suffice to show that the Polyanthus of those days was a flower of modest pretensions when compared with what it afterwards became. The author figures and describes four kinds then in cultivation, as follows: First, the 'White-eyed Polyanthus,' which is described as having "a good truss of flowers; the eye yellow; and the flower-leaves [*i.e.* the petals] finely marked with carmine." The illustration (Jan., no. 5) shows this flower to have been of a purplish-red, broadly edged with white, and a yellow eye. Secondly, there is the 'Stript and edged Polyanthus,' of which it is said that it "has no particular name, but it brings a good truss of flowers; the eye yellow, and the flower-leaves are white, strongly striped with carmine." The illustration (Feb., no. 14) shows it, to all appearances, exactly similar to the first-named kind. Thirdly, we have the 'Pantaloons Striped Polyanthus,' of which we are told that it

brings its flowers in trusses, but is double, like what is called hose-in-hose, being one flower in another; but the lower flower, instead of flower-leaves, has leaves like the leaves of the plant; [these are] for the most part green,

* *Gardeners' Dict.*, art. "Primula" (1731), and some later editions.

† *O.p. cit.*, seventh edition, art. "Primula" (1759).

‡ *The Flower Garden Displayed* (1734).

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but striped with red and white; so that, when the upper flower is decayed, this case [*i.e.*, the calyx] makes a fine appearance.

The illustration (Feb., no. 26) shows a flower much the same as the foregoing, but with a partially-coloured phyllodic calyx. Fourthly, we are told of the 'Goldfinch Polyanthus,' which

blossoms with a full truss of flowers upon strong flower-stems. The blossoms have yellow eyes and the other part scarlet, except the edges, which are yellow. The plant is very hardy, and . . . will give us its flower in December and sometimes in January. . . . Those of the sort which are most esteemed among the gardeners have thrum eyes, as they say, . . . but I have seen [pin-eyed] flowers that are much more beautiful in their stripes and colours. . . . There are vast varieties of this kind of flower.

The illustration (March, no. 13) shows, however, a yellow flower with terra-cotta stripes.*

If these figures, admittedly very poor, really represent the stage of development reached by the Polyanthus in 1734, the flower must have undergone remarkable development within the following quarter of a century; for the next coloured illustration of it I have been able to discover shows that, by 1757, it had been very greatly improved. In a work ascribed to "the late celebrated Mr. Hale," † but really written by "Sir" John Hill, M.D., there is a fair figure of the 'Polyanthus Primrose,' which, we are told, ‡ should be known as *Primula foliis sinuatis rugosis floribus umbellatis speciosis* (the Primrose with rough sinuous leaves and handsome umbellate flowers). The author speaks of it as "a plant as universally known as any that can be brought into a garden." Of the types then in cultivation he says little, though he makes it clear that they were already fairly numerous. After remarking that the flowers "are naturally of a beautiful crimson, with an eye of yellow," he says that, when plants are "encourag'd by a right culture, they will throw out a vast number [of flowers] on each head, whose variations in colour will be extremely pleasing, and the beauty in many of them [will] equal that of the Auricula." The particular flower illustrated § is, however, of a dark purplish-red, with a whitish centre and edge, and a yellow eye.

The Polyanthus craze (if one may so call it) seems never to have raged on the Continent to the same extent as in England. It may, indeed, be doubted if the plant had even reached Holland by 1720; for, in the fine collection of drawings of that date by J. G. Simula, now preserved in the British Museum, || there is no drawing of it, though no fewer than forty varieties of the Auricula are represented. Again, the Polyanthus is not mentioned by Linnaeus ¶ as growing in

* Further, we are told of the 'Purple Polyanthus,' as to which there seems to be some error; for it is said to flower in October, and that its flowers are not purple, but have "a yellow eye, and striped with a carmine colour upon a white ground, with the edges of the flowers white." The illustration of it (Oct., no. 4) does not help us; for it is undiscoverable in the group. Possibly some kind of Auricula was meant.

† *Eden: A Complete Body of Gardening* (Lond., 1757).

‡ *Op. cit.*, p. 157.

§ *Op. cit.*, pl. xiv. fig. 1.

|| Described in *Journ. of Bot.*, xxx. (1892), pp. 265-266.

¶ *Hortus Cliffortianus*, pp. 50-51 (1737).

the garden of George Clifford, at Hartecamp, in Holland, in 1737. In England, however, the craze continued, though apparently with lesser virulence than at first, throughout the rest of the eighteenth century, and is referred to by most horticultural writers of the period. Thus, in 1764, one James Justice wrote : "The varieties which are obtained every year by the florists who save and sow these seeds are very great, and some incomparable beauties happen often to reward the trouble of sowing and cultivating them."*

At the extreme end of the eighteenth century and the beginning of the nineteenth, the Polyanthus craze in England became intensified and assumed a new feature. Auricula and Polyanthus Shows became as usual and as popular as Rose Shows and Chrysanthemum Shows are to-day, and at them amateur growers competed very keenly for prizes. In 1792, James Maddock, a leading authority, wrote of the Polyanthus that

its present highly-improved state is, doubtless, the effect of long and assiduous culture, which (like [that of] the Auricula, Carnation, and Pink) has been chiefly confined to this country. The beautiful yellow of the Cowslip, which it did not formerly possess in the same degree of perfection it now does, has, in the opinion of some, been communicated to it within the present century by impregnation.† It has, likewise, received very considerable improvement in its other properties within the last twenty or thirty years; and the sorts known fifty years ago are not now in cultivation, being neglected in proportion to the successive acquisition of new and superior varieties.‡

Two years later, Mawe and Abercrombie described the Polyanthus as one of the noted prize flowers among florists, many of whom are remarkably industrious in raising a considerable variety of different sorts, as well as use every effort to blow them with every requisite perfection.§

At this period, too, much was written and printed on the subject. A work by one Isaac Emmerton, devoted almost exclusively to the cultivation of the Auricula and Polyanthus, appeared in 1816 and quickly went to a second edition.|| Moreover, the writers of all general works on gardening published at this period gave elaborate cultural instructions as to the methods of cultivation deemed best for the production of the finest flowers, and set forth in detail the code of artificial "points" or "properties" to which it was considered the flower should conform strictly for show purposes.¶ The fullest statement as to these is that given by Glenny in 1859;** but this need not be set forth here, as the points are of no interest nowadays.

* *British Gardener's Directory*, p. 215 (1764).

† This passage probably includes some *lapsus* on the author's part; for no "impregnation" of the Cowslip could well paint it yellower than it is naturally.

‡ *The Florist's Directory*, pp. 18-19 (1792).

§ *The Universal Gardner*, art. "Primula" (1797).

|| *Treatise on the Culture and Management of the Auricula, Polyanthus, &c.*, second edition, pp. 205-206 (1819).

¶ See, for example, J. C. Loudon, *Ency. of Gardening*, p. 974 (1822); Thomas Hogg, *Treatise on Growth and Culture* (Lond., 1812), second edition (Lond., 1822); William Henderson, *Mem. Caledonian Hort. Soc.*, iii. (1825) pp. 229-233 and 276-277; George Glenny, *Properties of Flowers and Plants* (Lond., about 1835), second edition (Lond., 1859); and John Slater, *Amateur Florist's Guide* (Lond., 1860).

** *Properties of Flowers*, pp. 65-67 and 80-82 (1859).

Emmerton in 1819, gave a list * of thirty-six "Fine Polyanthuses." Of these, he considered 'Nicholson's Tantarara' (a root of which sold in 1804 for 10s. 6d.) the best. Hogg, in 1822, gave a list † of forty-three kinds and figured one which was, he says, the "most esteemed" sort—a dark red, with a large yellow eye and a narrow yellow margin. Slater, in 1860, enumerated ‡ a number of kinds produced between 1821 and 1846, stating the year of production of each. It is, however, no part of my task to treat of these cultural matters, which I leave to skilled horticulturists.

To-day, though the Polyanthus is grown largely and as much admired as ever, its cultivation is no longer a *furore*. Most of the old sorts, once so highly admired, have been lost, as is inevitable; for there can be no permanence in a plant which is not only a hybrid itself (as shown hereafter), but is extremely ready to cross with any other form of its own kind (thus producing new colours and new combinations of marking), as well as to hybridize with almost any nearly-allied species. Nevertheless, it may be doubted whether some of the new forms produced by several growers in quite recent years are not finer and more gorgeously coloured than any of the older sorts now lost; and there is practically no limit to the possibilities of the further improvement of this delightful flower.

Having now traced the history of the Garden Polyanthus from its first appearance in cultivation, two centuries and a half ago, down to the present day, I proceed to deal with the question: What was the *origin* of the Garden Polyanthus? As in the case of the Garden Auricula already noticed, the plant is largely a product of the florists' skill and is unknown in the wild state. It is necessary, therefore, to enquire from what wild original species or form of Primula it has been evolved.

In this connexion, one may note that there has long been a general belief as to the plant's parentage and that many writers have expressed opinions on the point. Some of the chief of these may be noticed.

The Rev. W. Hanbury says that it was supposed to have sprung from the Primrose, but that the Cowslip and the [Hybrid] Oxlip were also "very near relations." §

W. Withering asserts || that "the different kinds of Polyanthuses, so much admired by florists, all originated from [the Primrose and the Cowslip]."

Curtis speaks of it ¶ as descended from the Primrose.

James Maddock writes **: "The Polyanthus . . . has been considered by different authors to have originated from different species of the [genus] Primula—some suppose the Cowslip: others the Oxlip."

* *Treatise*, pp. 205-206.

† *Treatise on Growth*, p. 181.

‡ *Florist's Guide*, pp. 14-15.

§ *Complete Body of Planting and Gardening*, i. (1770), pp. 286 and 739.

|| *Botan. Arrang. of Vegetables*, i. (1776), p. 144.

¶ *Flora Londinensis*, vi. (? 1790), pl. 16.

** *Florist's Directory*, p. 17 (1792).

Thomas Martyn, F.R.S., writes : " It is well known that the Primrose is the parent of the admired Polyanthus." *

Loudon says it comes from the wild Primrose, of which it is " a very permanent variety." †

The *Penny Cyclopædia* describes it as " a garden variety of the Oxlip Primrose " ‡ (whatever that may be).

Darwin says : " I have proved, by numerous experiments, . . . that the Polyanthus is a variety of *Primula veris*." §

Nicholson says it is " probably derived from a cross between the Primrose and the Cowslip." ||

The *Encyclopædia Britannica* says it " is probably derived from *P. variabilis*, itself a cross between the common Primrose and the Cowslip." ¶

The *New English Dictionary* defines it as " a favourite ornamental cultivated form of *Primula* (supposed to have originated from the Cowslip, *P. veris*, or a cross between that and the Primrose, *P. vulgaris*). " **

The foregoing statements show that, for a long period, it has been believed very generally that the Garden Polyanthus is closely related to both the Primrose and the Cowslip, and is probably a hybrid between the two. Yet, as will be seen, none of the statements quoted asserts this definitely. Each is an expression of opinion, rather than of fact. Clearly, therefore, the fact cannot be regarded as established. Further, the prevalent belief hardly accords with the fact that, whereas both the two species named as probable progenitors have *yellow flowers*, the Polyanthus, which is supposed to have been developed from them, has usually *very brightly coloured flowers*. Nevertheless, there can be no doubt whatever that the prevalent belief as to the origin of the Polyanthus is, in the main, quite correct. It remains, however, for this to be demonstrated clearly ; and to do this is my next task.

In the first place, it is necessary to note that, long before the appearance of the Garden Polyanthus, there were in cultivation, both in Britain and on the Continent, certain " polyanthus " Primulas which were, in a way, the progenitors of that plant, as will be shown hereafter. Among these was the well-known wild hybrid between the Primrose and the Cowslip (*P. veris* × *vulgaris*), generally known in Britain as the ' Hybrid Oxlip.' †† This plant occurs wild, generally in small numbers, wherever the two parent plants grow in close proximity, which is the case almost everywhere in Britain and in many places on the Continent. It is a handsome plant, larger and more showy than either of its parents, as is the case with many first-cross hybrids. Its attractions are, indeed, so great that cottagers are often induced to dig it up and remove it to their gardens : hence, it is now much less

* *Flora Rustica*, p. 62 (1792).

† Vol. xvii. (1840) p. 347.

‡ *Dict. of Gardening*, iii. (1887) p. 181.

** Art. " Polyanthus " (1911).

† *Ency. of Gardening*, p. 974 (1822).

§ *Forms of Flowers*, p. 18 n. (1874).

¶ Vol. xxii. (1911) p. 17.

|| See post, p. 23.

common than otherwise it would be. In fact, in some districts, more plants of it are to be seen growing in cottage gardens than wild in adjacent woods and hedges. This hybrid plant presents almost every conceivable intermediate form between its two parents, particularly in regard to the size and colour of its flowers. Moreover, these are produced, sometimes singly (like those of the Primrose), sometimes in umbels on a stout peduncle (like those of the Cowslip). Both forms of inflorescence often appear on the same plant—the single flowers always early in the flowering season (showing the influence of the early-flowering Primrose parent): the umbellate flowers always later (showing the influence of the late-flowering Cowslip parent). One noticeable feature of this hybrid plant is that, when it produces its flowers in an umbel (as it usually does), that umbel is always more or less lax and straggling, the elegant and characteristic one-sided droop of the umbel of the Cowslip being altogether lacking.

There can be no doubt that this wild ' Hybrid Oxlip ' is the plant figured by Clusius in 1601 and described by him * as *Primula veris pallido flore clatior*—that is, the "larger, pale-flowered Cowslip." The large flowers and straggling umbels of Clusius' figure would suffice to distinguish it from the common Cowslip, even if Clusius did not also figure that familiar plant,† while the same characters show also that it is not intended to represent another plant, widely distributed on the Continent and occurring in Britain, namely the "true" Oxlip (*P. elatior* Jacq.).‡ Probably, too, the Hybrid Oxlip is the plant called by Bauhin § *Verbasculum pratense inodorum*, and by Gerard || *Primula pratensis inodora lutea*. The latter says of his plant that its flowers are "not so thick thrust together as the former [i.e. the Cowslip], and they are fairer and fewer in number, and do not smell so pleasantly": all which helps to identify it as the Hybrid Oxlip.

Now, it was undoubtedly from a form of this ' Hybrid Oxlip ' that our Garden Polyanthus was evolved. But (as stated already) the flowers of the Hybrid Oxlip are *yellow*: those of the Polyanthus usually of *some bright colour*. It was not, therefore, until a Hybrid Oxlip with brightly-coloured flowers had been evolved that the Garden Polyanthus can be said to have come into existence. When, how, and where was such a plant evolved?

It is a fact little known, even among well-informed botanists, that the common Primrose, in certain parts of its extremely extensive range, produces flowers of which a very large proportion are not of the normal pale-yellow, but are of various bright colours—pink, red, scarlet, mauve, purple, or other tints. Such is the case, for instance, in the extreme west of Britain, France, and Spain; also in the extreme east of Europe and beyond. In certain localities in all these regions, perfectly wild plants produce more coloured flowers than yellow ones. The same is the case also with the Cowslip, which, in some localities

* *Rariorum Plantarum Historia*, p. 301 (1601).

† *Op. et loc. cit.*

§ *Phytopinax*, p. 460 (1596).

† See *post*, p. 23.

|| *Herbal*, p. 635 (1597).

in the same districts, produces flowers a large proportion of which are coloured, the colour varying from a pale reddish-brown, through terra-cotta, to a very rich dark orange-crimson. It is not easy to define the local influence which produces, in both species, the effect indicated ; but it exists.*

Now, inasmuch as the ordinary yellow-flowered forms of these two species are known to hybridize readily when growing in proximity, thus producing the common yellow ' Hybrid Oxlip,' there is obviously no reason why the red-flowered forms of the same two species should not similarly hybridize when they happen to grow in proximity, as they do in the extreme south-west of Wales, in Cornwall, in the extreme north-west of France, and doubtless elsewhere. As a matter of fact, they do so hybridize, at least in the first-named district, producing *a wild red form of the Hybrid Oxlip*. Through the kindness of Mr. J. E. Arnett, of Tenby, I have received such a plant from Pembrokeshire and have grown it.† It was a genuine wild red Polyanthus, needing only careful and long-continued selection in cultivation to develop into the Garden Polyanthus as we know it.

It is, I submit, in every way probable that our Garden Polyanthus was developed in cultivation from this wild red Hybrid Oxlip. If actual proof of this is not forthcoming, and is probably unobtainable to-day, it is at least certain that this development might very easily have come about.

There is, however, an alternative (and, perhaps, an even more probable) source from which the Garden Polyanthus may have been developed. It is well known that, from an early period, both Primroses and Cowslips having coloured flowers have been grown in English gardens ; for these plants are mentioned beyond doubt by our early horticultural writers, such as Gerard (1597) and Parkinson (1629). There is, indeed, clear evidence that English gardeners had long made a speciality of the cultivation of these and other handsomely-flowered Primulas of various kinds. This was fully recognized upon the Continent, where such plants have long been known as "English Primroses." Thus, as early as 1581, de l'Obel figured and described a fine double form of the Cowslip under the name "*Primula hortensis Anglica*, the English Garden Primula."‡ Fifteen years later, Bauhin wrote of the same plant under the name "*Verbascum hortense multiplex : Primula hortensis Anglica omnium maxima et serotina floribus plenis.*"§ At practically the same time, both Gerard || and Clusius ¶ alluded to these various cultivated English Primulas. Parkinson's evidence, of a quarter of a century later, is still clearer on the point : "We have [in England] so great variety of Primroses and Cowslips in our owne country breeding that

* I am about to treat elsewhere of this curious and little-known local colour variation in these two closely-allied plants.

† I much regret that, through misfortune, it was lost.

‡ *Plantarum seu Stirpium Icones*, p. 567, fig. 669 (1581).

§ *Phytopinax*, p. 461 (1596). || *Herball*, p. 636 (1597).

¶ *Rariorum Plantarum Historia*, p. 301 (1601).

strangers, being much delighted with them, have beene often furnished into divers countries, to their great content."*

But these early coloured garden Primroses and Cowslips were not hybrids, so far as one can gather: consequently, they were not coloured ' Hybrid Oxlips.' Yet the coloured forms of the two species named, if grown near one another in gardens, would inevitably hybridize as readily as the ordinary yellow forms. It is, indeed, impossible to doubt that hybridization of this kind really did take place, thus producing in cultivation the red Hybrid Oxlip which is known to arise in the wild state.† This hybrid would be readily capable of development, by a course of careful selection, into the Garden Polyanthus as we know it. Thus we have an alternative source from which the Polyanthus may very easily have been derived—a garden origin as well as a wild origin.

One is able, indeed, to fix approximately the date when the red Hybrid Oxlip, which was undoubtedly the original of our Garden Polyanthus, was first produced in cultivation. In this connexion Rea's statement quoted above ‡ is of interest. He says, writing in 1655, that the red Primulas of which he speaks *had been quite recently introduced into English gardens*, and were much esteemed because they were finer and of brighter hues than had been grown therein previously. As to the circumstances of the introduction of these finer sorts, we are able to obtain information from Parkinson, who tells us § that, shortly before he wrote in 1640, there had been introduced into English gardens, from " Turkey " (a name which had then a much wider application than now), the red-flowered Eastern form of the Primrose, already mentioned,|| which is more brightly coloured than the red form which grows wild in Britain. Apparently, it was introduced here by the elder Tradescant, but in all probability not from Turkey direct; for Jacobus Cornutus says ¶ that, when he wrote in 1635, it was growing in gardens in Paris; and, doubtless, Tradescant had it

* *Paradisus*, p. 242 (1629).

† That such hybridization still takes place to-day is certain. Apparently it is specially frequent in France, where various instances of it have been recorded. Thus, M. Germain de Saint-Pierre says (*Bull. Soc. Bot. de France*, xxii. (1875), pp. 184-185) that he gathered, in a meadow adjoining a *parc* in which numerous coloured Primroses were under cultivation, at Bessy (Nièvre), a number of hybrids which showed every gradation of colour, shape, and size between the Cowslip and the coloured garden Primrose. Again, l'Abbé T. Chaboiseau found a similar mixture in " le petit parc de la Grange-Perret," near Villefranche (Rhône), which had been neglected so long that the plants formerly cultivated therein had multiplied almost in a state of nature, producing almost every conceivable form of hybrid, coloured and otherwise, including Hybrid Oxlips, " à fleurs colorées, avec les mêmes variations de nuances " (see *op. cit.* xxix. (1882) p. xii). Further, M. X. Gillot records (*op. cit.* xxix. pp. xiv-xv) that he had gathered, in meadows near the garden of the Château at Rousillon, in Morvan (Saône-et-Loire), wherein many Primulas had been cultivated, numerous hybrids of all kinds and colours, including large-flowered reddish-yellow Cowslips (*i.e.* coloured Hybrid Oxlips). All these were certainly due to pollination of Cowslips growing in the meadows by the pollen of the coloured Primroses growing in the gardens. In the last-named district the Primrose does not exist in a wild state.

‡ See *ante*, p. 12.

§ *Theatrum Botanicum*, pp. 534-537 (1640).

|| *Plantarum Canadensis Historia*, pp. 84-86 (1635).

¶ See *ante*, p. 19.

from there. It was of this bright red 'Turkey Primrose' (*P. vulgaris* var. *rubra*: now often, but erroneously, called *P. Sibthorpii*) that Parkinson wrote in 1640, and Rea in 1655. It soon became very popular in English gardens. Without doubt, grown therein, it hybridized with the red Cowslips previously growing there, producing a more brightly-coloured Hybrid Oxlip than had before been obtainable, and this, under selection and high cultivation, soon began to develop into the Garden Polyanthus.

But whether the Garden Polyanthus came to us from the one or the other of these two possible sources (or, as is quite likely, from both in part), there remains not the least doubt as to what it really is—namely, an improved cultivated form of the hybrid between a red Primrose and a red Cowslip. In other words, it is a coloured 'Hybrid Oxlip,' but greatly increased in size and heightened in colour as a result of careful selection throughout the two centuries and a half during which it has been under cultivation. According to the recognized rules of botanical nomenclature,* it should be known as *Primula veris rubra* \times *P. vulgaris rubra*, Hort.

It is possible that there may be in the Garden Polyanthus a strain of some other species of *Primula* having brightly-coloured flowers; but I can see in it no trace of any such admixture, and I am convinced that there is none. Every character exhibited by it is exactly such as might be expected in a plant having the origin I have assigned to it, allowance being made for minor variations of secondary importance due to long-continued artificial selection; while the plant exhibits no character which is in any way discordant with that origin. Prof. Heslop Harrison—whose close study of our British *Primulas* and knowledge of their genetic relationships (the latter derived from many experimental crossings of them on Mendelian lines) enables him to speak on such a point with unique authority—allows me to say that he agrees entirely with what I have said above as to the origin and history of the plant.†

The fact that the Polyanthus produces its flowers both singly and in umbels is further evidence of its hybridity and its close relationship to the Hybrid Oxlip, which does the same.‡ It is true that, in the Polyanthus, the proportion of single flowers to umbellate flowers is very much smaller than in the Hybrid Oxlip; also that the umbels of the Polyanthus are usually much more regular and compact than those of the Hybrid Oxlip. Both these features are, however, such as might be expected in the Polyanthus; for horticulturists have sought long and persistently to eliminate its tendency (inherited, of

* As settled at the International Botanical Congress held at Vienna in 1905.

† There is, I admit, one particular form, bearing its flowers (generally yellow) very erect, in a stiff, regular, flat-topped umbel, and having unusually large leaves, which, at one time, I thought might have in it a strain of some other species; but I now believe that this is merely a slightly aberrant form, due to artificial selection, and that, in its origin, it differs in no way from the ordinary form. Prof. Heslop Harrison informs me that he considers the same might be said of several other slightly aberrant forms he has in cultivation.

‡ See *ante*, p. 19.

course, from its Primrose parent) to produce its flowers singly and to emphasize and perpetuate its other tendency (inherited, of course, from its Cowslip parent) to produce its flowers in umbels; also to ensure that its umbels shall be more regular and presentable in shape than those usually produced by the wild Hybrid Oxlip. In both these objects they have largely succeeded.

Again, one may note the fact that the Polyanthus shows a very strong tendency to produce its single flowers early in its flowering season and its umbellate flowers later. I have myself observed this tendency, and of its existence I have been assured by Polyanthus growers of long experience. This fact is, of course, further evidence, not only of the hybrid nature of the plant, but also of its close relationship to the Hybrid Oxlip, which shows the same tendency.* In both plants the early appearance of the single flowers is obviously due to the influence of the single-flowered, early-flowering Primrose parent, while the later appearance of the umbellate flowers is obviously due to the influence of the umbellate-flowered, later-flowering Cowslip parent.†

It is worth noting, perhaps, that in one respect the Garden Polyanthus does differ from the wild Hybrid Oxlip. The latter is, in the wild state, largely sterile, a fact to which many writers on it have testified. I have noticed, in connexion with the wild-grown plants I have had in cultivation, that their flowers have remained out an extraordinarily long time, as though in the hope of thereby securing pollination; yet they have set little or no seed. On the other hand, the Garden Polyanthus is fully fertile and sets seed freely without artificial aid—a fact which is well known to growers. It appears, therefore, that in the case of the Polyanthus the original sterility of its wild parent has been “bred out” in the course of the long period during which it has been under cultivation.

In passing, one may note that Willkomm and Lange ‡ and not a few other Continental writers have expressed their belief that the Garden Polyanthus is a form of “*P. elatior*”; but such is certainly not the case—not even in part. The Polyanthus does not exhibit one single character which can be supposed to be derived from that plant. It may very well be, however, that Willkomm and Lange mean, not the *P. elatior* of Jacquin,§ the “True” Oxlip, but the “Hybrid Oxlip” (*P. veris* × *vulgaris*), which countless writers have confused with it, because there is a general superficial resemblance between the two. The true *P. elatior* of Jacquin is an absolutely good species, not a hybrid—a point as to which there has been an immense amount of misunderstanding. It is a plant with a curious distribution, being spread widely over the Continent, but confined in Britain to

* See *ante*, p. 19.

† Further, I have observed in the Polyanthus that yellow-flowered plants show a tendency to remain in bloom for some time after the red-flowered plants have gone off bloom—a tendency probably also inherited from its yellow-flowered, late-blooming parent, the Cowslip.

‡ *Fl. Hispania*, ii. (1870) p. 637.

§ *Misc. Austr.*, i. (1778) p. 158.

a single very limited and very sharply-defined area in the Eastern Counties.* In this country, at any rate, it has practically never been in cultivation until the last few years. If, therefore, the "*P. elatior*" referred to by Willkomm and Lange and the others is the common hybrid, often called *P. elatior*, not the true *P. elatior* of Jacquin, then it is obvious that their view as to the ancestry of the Garden Polyanthus is precisely in accord with what I have expressed.

Anyone glancing casually at the Polyanthus as we see it to-day, with its stout, straight peduncle and its umbellate inflorescence, would inevitably conclude that, of its two parent species, the Cowslip strain in it was more potent than the Primrose strain; but Prof. Heslop Harrison believes, as a result of his experiments, that the contrary is the case. He writes me :

For many reasons, I believe that the Primrose has contributed much more to the plant as we now know it than the Cowslip. Its fertility (which is almost perfect) seems to be that of a back-cross or repeated back-crossings. On Mendelian lines, this need not eliminate its rich colours, umbellate inflorescence, &c. Further, it is not so fertile with the pure Cowslip as with the Primrose, and its crosses (F_2) with the former show many abnormalities. In that generation, almost pure *P. veris* forms segregate from such crosses. Many Polyanthus and Cowslip hybrids have bad pollen, both in F_1 and F_2 generations. Detlefsen found the fertility of Guinea-pig hybrids to increase very rapidly with repeated back-crosses. He worked with *Cavia rufescens* and *C. porcellus*, and his colours worked out on an almost strictly Mendelian basis.

A point of interest, and with some indirect bearing on this subject, is that some at least of the so-called "Coloured Cowslips" of the seedsmen are first-crosses between the darker Polyanthus and the Cowslip. The point that baffles me is the fact that they look and smell exactly like Cowslips, except for colour. In the next generation, they yield Cowslips and darker Polyanthus forms, with nondescript plants of very poor appearance. I had one such lot sent under the name *Primula grandiflora*!

In conclusion, there is one point connected with the history of the Garden Polyanthus which, though it has been referred to already, may well be emphasized again—namely, that, whatever its precise ancestry may be, it is a plant of English (or, at any rate, British) origin, having been evolved solely by the cultural skill of British horticulturists. This is shown clearly by the fact that, on the Continent, the plant is generally known as the "English Primula," that name having, no doubt, descended to it from the other handsome garden Primulas produced long since in this country and much sought after by Continental growers, as noted already.† Even such recent and authoritative writers as Pax and Knuth treat of it under the name of *Primula anglica*.‡ We are, indeed, justly entitled to congratulate ourselves upon the fact that the cultivation of the British members of the genus *Primula* and their development, by means of hybridization and selection, into strikingly handsome new garden plants has been for centuries a speciality among English gardeners; and long may it continue to be so!

* See *Journ. Linn. Soc., Bot.*, xxxiii. (1897) pp. 183-190; and *Journ. of Ecology*, x. (1922) pp. 200-210.

† See ante, p. 20.

‡ *Primulaceae*, p. 65 (1905).

FIG. 2.—JICHUANG RANGE FROM THE NORTH-EAST.
Showing the main peak, 16,000 to 20,000 ft., and glacier. (Taken at 14,000 ft.,
five to six miles away, July 1918.)





FIG. 3.—*MELIOSMA CUNEIFOLIA*.

A single shrub on margin of thicket of *Acer Davidii*, Lichiang Range,
alt. 11,000 ft. June 1913.



FIG. 4. *NOMOCHARIS FORRESTII*.
(Alpine moorland, 12,000 ft.)

[*Plate p. 25.*

FIG. 5.—*Ligustrum ionandrifolium* ON THE LICHIANG RANGE.



EXPLORATION OF N.W. YUNNAN AND S.E. TIBET,
1921-1922.

By GEORGE FORREST, V.M.H.

FOLLOWING the trend of the country covered during 1917-20, exploration was continued farther north and west, westwards to and beyond the summit of the Salwin-Kiuchiang divide, as well as northwards on that range, and much farther north on the Mekong-Salwin watershed, especially on the western slopes thereof, in the Salwin Valley.

The Salwin-Kiuchiang divide is the watershed between the Salwin and the Faron, the latter being the most north-eastern affluent of the Irrawaddy, and I use the Chinese name for it—Kiu Chiang—as the greater part of the region mentioned is under Chinese jurisdiction.

Collecting was also carried on in other areas, some of which had been partially explored in previous years, such as the mountains east and north of Atuntze; the ridges east of the Bei-ma Shan, and on the Hom-po Shan, which is a large buttress extending west from the Bei-ma Shan to the Mekong Valley; also on the highlands east of the Chungtien plateau in an attempt to link up with the Mu-li district, an object frustrated by trouble arising amongst the natives towards the end of 1921.

New country was also tapped, roughly in a circle west, north, and east of Mu-li; but this, though successfully carried on during 1921, had to be abandoned in the early summer of 1922 through trouble with the local lamas, not from any fault on my part or that of my men—for we had for many years been on particularly good terms with the head lama and his adherents—but from other causes. This was rather a set-back to us, as, following successful spring and early summer work, we had been looking ahead to a bountiful harvest of seed of many good things; but, in Yunnan, such occurrences may always be expected, and therefore we were prepared to strike out in some other direction. Thus parties of men fell back on the ranges surrounding the valley of the Litang to the south, whilst others pushed farther eastwards into the mountains lying in that direction from Yung-ning. A number of collectors also went to a new area of the Mekong-Yangtze divide, which eventually proved exceptionally rich in things new to us, and particularly interesting in that there were collected specimens of many species previously only known from the far north-west Mekong-Salwin divide.

New districts north and east of Yung-peh were thoroughly ransacked, but the region is a particularly dry one, and not prolific except in xerophytic forms of many shrubs and herbs known elsewhere in Yunnan. A limestone formation, given a heavy or even a steady

moderate rainfall, will produce a richer flora than any other I know, but there is nothing poorer than such a region in dry belts.

One fine species found on the hills north and west of Yung-peh is *Osmanthus Forrestii* Rehder, for flowers and fruits of which I had searched for many weary years. Flowering specimens were secured in 1921 and a fair quantity of good seed the following year, but, unfortunately, through accident, most of that was lost. However, this year, just recently, I received a fine consignment of seed in perfect condition from some of my men who are still collecting for me there.

It is a shrub of 10 to 20 feet, evergreen, with light green bark resembling that of some of our hollies, and long, rather broadly lanceolate dull-green foliage, which in the young growths is entirely unarmed, though the fully developed older leaves have strongly spinous margins. The flowers are twice the size of those of *O. Delavayi* Fr., borne in dense axillary clusters, waxy white, or very pale honeysuckle yellow, and deliciously fragrant. The fruits are large, $\frac{1}{2}$ to $\frac{5}{8}$ inch by $\frac{3}{8}$ inch, ovoid, on short pedicels, in colour deep blue-purple with a heavy waxy bloom, in size and form very much resembling the ripe fruits of *Prinsepia utilis*.

We secured abundance of specimens in flower during the winter of 1921-22; the species is in full bloom during December and January, ripening fruit in late July or August.

Flowering specimens were collected the same year of another fine species peculiar to the same hills north of Yung-peh, *Rhododendron catapastum*, Balf. fil. et Forrest, and which, for similar reasons, had escaped our net for many years.

It is one of the *Heliolepis* group, a shrub of 6 to 12 feet in height, having the typical short, open rose or purplish-rose flowers and russet-brown foliage seen in other members; but the leaves are much larger and broadly ovate, even elliptic, a marked divergence from the type. It is a strikingly handsome shrub, and for its foliage and other points I should place it next to *R. pholidotum* as a plant for our gardens.

The range of mountains stretching northwards from the Sung-kwei Pass to Kou-la-po and beyond to the south end of the Lichiang Valley was explored, and many species new to previous collections secured. One most interesting and beautiful plant was rediscovered—*Meconopsis betonicifolia* Fr.—which was first found by Père Delavay during 1889 in the same area. It is a plant of the higher, lush, alpine meadows, sheltering amidst dwarf scrub or on the margins of alpine thickets. The scapes are stiff, $2\frac{1}{2}$ to 3 feet in height, the average plant bearing 4 to 7 semi-pendulous blooms on long, rather stout pedicels. The corollas are as much as 3 inches or even more in diameter, of a soft clear saxe-blue shade with bright yellow anthers. The leaves are very delicate, bright green with peculiarly indented margins and tinged brown with scattered golden hairs.

On the steep meadows flanking the summit of the Sung-kwei Pass was found the dwarfest and finest form of *Rhododendron racemosum* Fr. I have yet seen. It is my No. 19404, and at 12,000 feet on light rubbly

limestone soil the whole hillsides were clothed with it. The individual plants were from 6 to 14 inches in height, and were literally smothered in blooms of the purest cerise-pink.

Another fine plant found on the same mountains though at lower altitudes is *Lilium* sp. (?) F. No. 21578. It is a species having affinity with *Lilium Delavayi* Fr. and also *L. yunnanense*, but in my opinion it is very different from both, and, even if not, eclipses either of them in its claims for horticultural distinction.

It is a plant of 20 to 30 inches in height, the stems very leafy, the leaves narrow, somewhat pointed and greyish with silky hairs. The flowers are usually solitary, but are occasionally produced in pairs, or, as has already been proved by plants flowered in the Royal Botanic Garden, Edinburgh, from bulbs brought home by me this year, even in fours or fives, fragrant, of the same form and size as those of *L. Delavayi*, though not so open, of a rich golden-yellow throughout, minutely speckled purple on the interior from the base to the very tips of the segments. This colour and marking is never seen in *L. Delavayi* or any of its group, for flowers of the type are, almost invariably, of a dirty olive shade, blotched purple on the interior base, and at best most unattractive. It is a woodland plant growing in a deep loose compost and in half shade, in very open mixed and oak forest, at an altitude of 9,000 to 10,000 feet.

No further work was done around Tali or Tengyueh, though in both areas there is still a great deal of unexplored country; for instance, the Ghi Shan east of Tali, and the heavily-timbered western flank of the Tali Range, as well as the many lesser ranges north and north-west of Tengyueh. However, early in 1921, whilst passing through the latter district, a short journey was made north to secure good flowering material of *Rhododendron giganteum* Forrest. The inflorescence, in keeping with the huge growth of the species, is of great size, individual trusses having as many as fifteen to twenty large fleshy blooms, each of about 2½ to 3 inches by 1½ to 2 inches, in colour either deep crimson throughout with a small black-crimson blotch at base, or deep rose-crimson at margin shaded to almost white at base, lined on exterior a lighter shade of rose, the only marking a small deep crimson blotch at base.

It is assuredly a magnificent species, and exceedingly rare, for, though extensive search was made, only the three trees originally discovered in 1919 were seen.

In such a note as this it is impossible to give more than the briefest outline of what was done and what found during the two years, touching merely here and there on a few of the most outstanding species.

As I was principally engaged in a search for new Rhododendrons, they naturally fall first on the list.

In the herbaria of the two years something like 1,300 numbers cover species of Rhododendrons, inclusive, of course, of a goodly number of duplicates in fruit. Roughly, I should say, specimens of

500 to 600 species were collected, of that number 150 or even perhaps more being new to all previous collections made by me.

Our finds of the years 1917, 1918, 1919, and 1920 proved the genus prolific enough as seen on the Mekong-Salwin divide, but as nothing by comparison to the diversity of species and forms which we discovered on the Salwin-Kiuchiang divide, a wealth of *Rhododendron* beyond our wildest expectation. Plants new to us were collected almost every other day, even to the last of our search, showing that beyond, yet farther north-west, the ground might prove as rich.

Numerous species were found which form groups around hitherto isolated types, as for instance *R. floccigerum* Fr., a fine species of the Sanguineum series of 2 to 4 feet discovered by Père Soulie in the 'eighties of last century, which has bright cherry-red or light crimson blooms in loose clusters of five to seven, light green, narrowly lanceolate leaves, coated beneath with a very loose, long, light cinnamon-coloured tomentum. We found several species akin to the type in foliage and habit, but differing from it in many minor details and in the flower shade, two of the species having bright yellow flowers margined and lined pale rose, one rose-red, whilst in another the blooms are black-crimson, the shade seen in those of *R. haemaleum* Balf. fil.

The same with the Haematodes group, the type of which is *R. haematodes* Fr., a species of 2 to 3 feet with coriaceous, ovate-oblong leaves, coated beneath with a very heavy dense red-brown tomentum, and loose trusses of three to five deep crimson, large, fleshy blooms.

A dozen or more species were seen and collected which agreed with the type in having the heavy brown-red tomentum on the under surface of the foliage, but which differed variously in stature, size and shape of leaf, and the size and colour of flower, there being shades from light rose through cherry-reds to crimson and black-crimson, whilst one species has creamy white and another pure yellow blooms margined pale rose. We also secured specimens of several species of that group the flowers of which had abnormally developed calyces, in some enlarged to two-thirds the size of the corollas, and in all instances fleshy and of the same rich colour as the flowers themselves.

The same riotous wealth of forms was found to exist in the series named Eclecteum, which is of the Thomsonii group. With the Thomsonii form of foliage the type has beautiful rose-crimson flowers. A short list of the Field Numbers with the height and flower-shade of the forms may convey some idea of what we saw.

F. No. 21769. Eclecteum Group, 4 to 5 feet, rose-crimson.

..	21770.	"	"	4 to 6 feet, white margined rose.
..	21838.	"	"	4 to 5 feet, white spotted crimson.
..	21839.	"	"	4 to 5 feet, pale yellow.
..	21840.	"	"	4 to 5 feet, rose-magenta.
..	21841.	"	"	4 to 6 feet, pale yellow.
..	21842.	"	"	4 to 5 feet, deep magenta-crimson.
..	21881.	"	"	5 to 7 feet, deep rose-crimson.

F. No. 21882. Eclecteum Group, 4 to 5 feet, white ± flushed rose.

- .. 21883. " " 4 to 6 feet, deep rose.
- .. 21884. " " 3 to 6 feet, pure rose and having a distinct tomentum.
- .. 21885. " " 3 to 5 feet, white faintly flushed rose.
- .. 21886. " " 4 to 6 feet, pure white without markings.
- .. 21887. " " 3 to 6 feet, pale rose.
- .. 21888. " " 4 to 5 feet, yellow, lined and margined rose.
- .. 21889. " " 4 to 5 feet, pure deep yellow.

In a number of new species of the Fulvoideas series collected, the colour range is even more wonderful : from pure white through shades of pink and rose to the deepest crimson, either self-shades or spotted and blotched crimson, whilst five of the number have pure soft yellow blooms, or yellow faintly flushed rose on exterior.

Put to the acid test by botanists, it may be said, and in a sense perhaps justly, that all these are merely colour forms of a few species. Yet they differ one from the other and from the type in many small ways, and it must be borne in mind, when determining them, that they grow at widely separated points over a stretch of country extending fully 100 miles in latitude. And even assuming they are only colour forms of the various series to which they belong, it is just such plants which may prove the very cream of our gardens in the near future.

The finest of the Fulvoideas series seen is F. No. 21869. A shrub of 25 feet, it has fine large foliage with a heavy pale cocoa-coloured indumentum, and flowers a most lovely shade of pale pure rose-pink, almost an aniline shade.

R. sinonuttallii Balf. fil. et Forrest and *R. megacalyx* Balf. fil. et Ward were seen in plenty, both shrubs of 6 to 9 or even more feet. Both have exceptionally large trumpet-shaped pure white blooms, which are deliciously fragrant, and a plant well flowered at a short distance looks as if decked with lily blooms. The foliage of the former is specially fine, large, bullate, and glistening on the upper surface, whilst the under surface glistens golden-brown with innumerable glandular hairs.

R. Genesterianum Forrest, though not a common species, was seen in numbers in many places. It was first discovered in 1919 on the same range as far south as lat. 26° N., east and a little north of Hpmaw in Burma, and, as well as being beautiful, it is a most interesting species, for with a stature of 5 to 10 feet and willowy, narrow foliage, it has trusses of small bell-like flowers, identical in colour, form, and texture to those of *R. campylogynum* Fr.

Another curious and interesting species is *R. sinovaccinioides* Balf. fil. et Forrest, more like a *Vaccinium* in its tiny rounded glossy foliage and small solitary white flowers in the axils of the leaves. The capsule—narrow, long, and pointed—reminds one more of a

Gesnerad than a Rhododendron. The seeds have a long, pointed, silky membrane extended from both ends. The species was first discovered in July 1921, and in 1922 abundant material, both in flower and fruit, was collected, and a quantity of seed secured.

Quite a number of new forms belonging to the Sanguineum group were found, and also one or two new of the Martinianum series.

Some six or eight new shrubs were added to the list of the Selenses, all most lovely shrubs, several of them with pure yellow flowers, amongst the latter being the beautiful *R. panteumorphum* Balf. fil. et W. W. Sm., first discovered in 1905 and then lost sight of until now.

Two new species were added to the Forrestii group. One especially fine new species is that under F. Nos. 21693 and 20322. It is one of the same section as *R. adenopodium*. A shrub of 9 to 18 feet, with handsome lanceolate foliage, tapered to both ends though broadest near the apex, dark green above, glaucous grey beneath, somewhat like that of *R. hypoglaucum* but more pointed. The flowers are numerous, in rounded, though not compact, trusses, borne on long pedicels, and are of medium size, openly bell-shaped, creamy-white in colour, with brown-crimson markings.

Another remarkable species is under Nos. 21811 and 22856. It is epiphytic on the largest trees in dense forests; the pendent branches, as well as leaves, are exceedingly tough, almost leathery. The flowers are axillary, in loose clusters of three to five, and are borne on very long pedicels. Unfortunately, only fruiting specimens were collected, and the flowers were not seen. A fair quantity of seed was obtained. In general appearance it somewhat resembles *R. camelliaeflorum*.

A strikingly graceful shrub was collected under Nos. 21707 and 21778. Branched from the base, or almost so, it attains a height of 6 to 10 feet, the bark on the older wood a ruddy brown-crimson, peeling off in thin strips, the younger wood dull grey, the foliage willow-like, light green above and dark grey beneath. The flowers are in terminal compact clusters, occasionally axillary, of five to eight blooms; these are long, tubular, and bright yellow when fresh.

Almost in the same locality were found and collected flowering and fruiting specimens, and abundance of seed, of *R. tephropeplum* Balf. fil. et Farrer, a beautiful dwarf, first discovered by Mr. R. Farrer in 1920, shortly before his death, and of which he did not secure fruiting specimens or seed. It is a shrub of only 2 to 3 feet, with narrowly lanceolate, rather stiff leaves, which are bright green above and dark ash-grey beneath. The blooms are sometimes solitary, occasionally in pairs or even threes, fleshy, semi-pendulous, and openly funnel-shaped, varying in shade from dark to light rose, with fairly large calyces coloured as the corolla. It is a charming species and will be a splendid addition to our rock gardens.

Whilst one party of men collected as far north as possible on the Salwin-Kiuchiang divide, I had also another working southwards on the same range in an attempt to link up with the ground partially explored by Mr. Farrer during the summer of 1920. His farthest

north was just north of the Chawchi Pass, in lat. $27^{\circ} 25'$ N. Some of my men got as far south as lat. $27^{\circ} 40'$ N., and as a result some of the good things secured by Mr. Farrer were in the collection made by them, such as *R. tephropeplum*, *Primula Valentiniana*, *P. Agleniana*, etc. There is every evidence that towards the last Mr. Farrer had reached an area prolific in new and good cultural plants, but most unfortunately he did not survive to reap the harvest promised him.

On the stretch of range covered during the two years, approximately from about lat. $27^{\circ} 40'$ N. to lat. $28^{\circ} 50'$ N., outside the many Rhododendrons found, a good haul of most interesting trees and shrubs was made, many entirely new, as well as others new to any previous collections made by us; but as yet only a very few have been determined and named.

Three, or possibly four, species of *Acer* are amongst the lot, as also some of the rarer forms of *Acer Davidi*, and several new species of *Euonymus*.

Nothing new in *Magnolia* was seen, though such species as *Magnolia rostrata*, *M. nitida*, and *M. mollicomata*, all of which were first discovered on the Mekong-Salwin divide, were found in many places. *M. tsarongensis* W. W. Smith et G. Forrest, the only species known from the divide in 1919, was also re-collected.

Though large quantities of thoroughly ripe seed of all those species have been sent home from time to time, only a very small percentage has germinated. Of *M. rostrata*, I doubt if there be six plants in this country, though of both *M. nitida* and *M. mollicomata* there are a greater number. All are handsome species.

M. rostrata W. W. Smith, first collected in 1904 on the Mekong-Salwin divide, is a deciduous tree of 30 to 80 feet, with extremely large obovate or obcordate, strongly-veined leaves, the lamina of some of the largest measuring 18 by 12 inches, or even more in exceptional specimens. The flowers are fragrant, 5 to 7 inches in diameter, ranging from a creamy-white to a beautiful shade of pure self-pink, most often than lighter.

The species was found by both Mr. Farrer and myself, in 1919, as far south as lat. 26° N. on the mountains east of Hpimaw. There the flower colour varies more than in the northern habitat.

M. nitida W. W. Smith is an evergreen of 25 to 40 feet, generally branched from the base, with leathery, glossy, dark-green foliage, at a distance having the appearance of a gigantic laurel. The flowers, freely produced, are white, flushed purplish on the exterior, 3 to 4 inches or slightly more in diameter. It is an attractive shrub even when not in flower.

M. mollicomata W. W. Smith, also deciduous, is a shrub or tree from 20 to 30 feet in height, with rose-pink flowers, much like those of *M. rostrata*, but smaller, and with much smaller leaves, which are densely tomentose, especially in the young state.

M. tsarongensis W. W. Smith et G. Forrest is least in stature of all—a shrub of 18 to 20 feet, with the foliage most often densely

coated with a brownish glistening tomentum. The flowers are comparatively small, only 3 inches, or less, in diameter, and generally turned down, as in *M. Wilsonii*, creamy-white and delicately fragrant.

Of Enkianthus three or four species new to us were collected. One of them is a specially fine shrub of 6 to 9 feet, with large leaves of a very light green, veined and marbled dull creamy-yellow, whilst the pendent flowers, twice the size of those of any other species I know, almost an inch in diameter, are dull yellow, lined rose.

Another species has smaller light-green foliage and deep, soft rose blooms lined clear green, and is a shrub of 20 feet.

Yet another, a shrub of 4 to 6 feet, has still smaller foliage, and extremely small green flowers on long pedicels, whilst the last of all has pale pink blooms of normal size, and is a shrub of 6 to 9 feet in height.

Specimens and seeds of *Ribes laurifolium* were collected, besides two more species, both small alpine shrubs of 4 to 6 feet, one with small foliage and black, tasteless, or only slightly acid fruits, the other with much larger leaves and abnormally large bright crimson fruits, produced abundantly, but extremely biting and astringent.

Many fine species of *Prunus* were secured, the most striking being one which has large pink flowers and deeply cut, almost laciniate, foliage. It is a shrub of 6 to 10 feet, branched almost from base, a true alpine, found in small colonies with other shrubs on rocky slopes at an altitude of 12,000 to 13,000 feet. The fruits are ovoid, of fair size, in colour from light to deep crimson, sub-acid, but with little flesh.

Of *Styrax* two species were seen, both very beautiful free-flowering shrubs of 12 to 24 feet. One of them is almost certainly *Styrax shweilensis* W. W. Smith, though so very far north of the original habitat and at such greater altitude it might well be a new species. The other has not, so far, been named.

The middle and lower slopes of the range are very rich in flowering shrubs and trees, so extraordinarily rich that to give even a list of the many finds is almost impossible.

Many fine species of *Sorbus* were collected, and one curious feature noted of members of that group on the Salwin-Kiuchiang divide is that the great majority of them have deep crimson flowers, which is the exception with those found east of that point.

Sorbus Harroviana, a species having the largest foliage of all, was found in quantity, and good material of both flowers and fruit secured. This is one of the many white-flowered species; the individual flowers though numerous are exceptionally small, and the fruits the smallest of all I know, only $\frac{1}{8}$ inch diameter and pure dull white. In keeping with all of the genus, the foliage becomes beautifully coloured in autumn, *Sorbus* in company with the *Acers* and *Euonymus* above all else in the deciduous forests giving the finest autumn shades.

Members of many other genera were found in the same belt, or as undershrubs in the mixed coniferous and deciduous forests, such as



FIG. 6.—*RHEUM ALEXANDRAE* WITH *RHODODENDRON HIPPOPHAEOIDES*
AT BACK.

[To face p. 32.]



FIG. 7.—*PICEA LIKIANGENSIS*.
A tree of 100 to 120 ft. in height and 4 ft. in diameter at a
yard from the ground.



FIG. 8.—*OMPHALOGRAMMA SOUTIEI*
Flowers deep rosy purple, tube yellow



FIG. 9.—IN THE MIDDLE A SINGLE PLANT OF ASTER STATICEFOLIUS Fr.

species of *Davidia*, *Fraxinus*, *Alnus*, *Carpinus*, *Betula*, *Populus lasiocarpa* and *tibetana*, *Quercus*, *Castanopsis*, *Viburnum*, *Syringa*, *Dipelta*, *Spiraea*, *Eriobotrya*, *Symplocos*, *Berberis*, *Clematis*, *Lonicera*, *Itca*, *Pyrus*, *Craibiodendron*, *Meliosma*, *Lindera*, *Litsea*, *Machilus*, beautiful Araliads of many genera, etc. These are only a few of the many groups represented in each day's collecting.

Above 12,000 to 13,000 feet, Rhododendrons are dominant everywhere, as forest trees in the conifer and deciduous belts, forming forests themselves above that and in the corries and glens, clothing the rocky slopes and cliffs, and carpeting the alpine meadows and moorlands to the almost complete exclusion of all other ligneous growth. They seem to have adapted themselves to every variety of situation; almost everywhere within a few hundred yards one may find a dozen species. Even to note the individual forms would take a good-sized volume; whilst the combined effect, when most are in flower in May to July, is indescribable.

Forests of conifers are seen the whole length of the range, roughly speaking, extending from 10,000 to 14,000 feet, and a few new species and forms of *Abies*, *Picea*, *Tsuga*, etc., were marked and collected. During the autumn of 1922 a large quantity of seed of the true *Abies Delavayi* Fr. was collected on the Tali range, the "locus classicus" of the species, and there is now a large stock of seedlings in the Edinburgh Botanic Garden.

It is almost needless to mention the wealth of the alpine herbaceous flora; so much is now in cultivation from that region that it is anticipated. Every meadow above 10,000 feet is a veritable flower garden, a riot of colour, the scheme of which changes month by month, the last on the very highest of the Alps being the cushion Saussureas, Gentians, and Saxifrages.

Many new forms were collected of *Cremanthodium*, *Senecio*, *Aster*, *Erigeron*, *Lactuca*, *Delphinium*, *Aconitum*, *Meconopsis*, *Orchis*, *Campanula*, *Cerastium*, *Saxifraga*, *Gentiana*, *Swertia*, *Pedicularis*, *Cyananthus*, *Codonopsis*, *Anaphalis*, *Allium*, *Androsace*, *Hypericum*, *Adenophora*, *Corydalis*, *Anemone*, *Impatiens*, *Geranium*, *Diapensia*, *Strobilanthes*, *Incarvillea*, *Saussurea*, and of a host of other genera.

But in the spring and early summer the glory of the Alps are the numberless species of *Primula*, excelling all other herbs in their beauty and grace, painting every situation with their rich-coloured blooms, ubiquitous as the Rhododendrons on those ranges.

During the last twenty years N.W. Yunnan and S.E. Tsarong have given us about 200 species of *Primula*, many of them now well known as garden plants and all of which shall yet have their place with us. Yet, as exploration is extended in the north-west, more and more species are met with, and in evidence thereof during the past two years over thirty new species and forms were discovered, descriptions of which will shortly appear in the *Notes* of the Royal Botanic Garden, Edinburgh.

A further supply of seed of many of the finer species described
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by the late Sir I. B. Balfour, and published in the above in 1920, was collected, such as the *Primulas Agleniana*, *chungensis*, *calcicola*, *firmitipes*, *atunzuensis*, *flexilipes*, *sinopurpurea*, etc., most of which are plants of the western divide.

Descriptions of the new finds will shortly appear, but it might be of interest to note a few of them here and to mention that seed of all or nearly all of them was collected, and has germinated at Edinburgh and elsewhere.

Omphalogramma minus Hand. Mzt.—A dwarf in the genus, of 2 to 4 inches, but having large flowers of a very rich shade of deep indigo-purple.

Omphalogramma elegans.—A plant of 6 to 10 inches, having smaller leaves and more slender scapes than the others, and with large slightly fringed flowers of a deep purple blue, the tube yellowish.

Primula Valentiniana Hand. Mzt.—A beautiful dwarf species of the Amethystina section, of 1½ to 3 inches. Arising from a scanty rosette of small leaves on stoutish scapes, the flowers are solitary, occasionally in pairs, fragrant, pendulous, deep purple-crimson, the calyx intense black-maroon. It has all the appearance of a dwarf *P. secundiflora* or *vittata*, the flowers almost identical with those of these two species, differing in size, however, and totally distinct in every other point. Collected also by Mr. Farrer in 1920.

Primula tapeina.—Of the Suffruticosa group, and nearest to *P. Dubernardiana*, but quite distinct from it in every way. It is a compact cushion plant of 6 inches to 2 feet diameter, and marvellously free-flowering, the blooms borne on such short pedicels as to have the corollas almost flush with the foliage, and so numerous in some specimens that scarce a leaf is visible. The flowers are white, or white tinged rose, with the eye yellowish, and are fragrant. It grows on shady, dry, limestone cliffs.

Primula Pauliana.—A most striking species of the Geranioides section, and the only yellow-flowered member of it. It is a plant of 9 to 18 inches, the inflorescence lax, racemose, secund; flowers large, pale yellow, tube orange. A plant of woodland or open meadow, and margins of forests and thickets.

Primula oxygraphidifolia.—A plant of 2 inches or even less, and belonging to the Tibetica section. Foliage exceedingly small, fleshy, heart-shaped; flowers solitary, large, lavender-blue, eye grey-yellow. On ledges and in crevices of cliffs and on open stony pasture by streams.

Primula monantha.—A very rare plant of the Gemmifera section and allied to *P. chrysopa*. It is only 1½ to 2½ inches in height, with large flowers of a shade of soft purplish-rose, and affects stony meadows.

Primula ingens.—The most robust of all the beautiful Nivalid *Primulas*, attaining a height of fully 3 feet. The foliage is handsome, and the large, fragrant, soft purple-blue, lavender, or even pale rose blooms are produced in great abundance in crowded superposed umbels.

Primula eucyclia.—A lovely little species of $\frac{1}{2}$ to $2\frac{1}{2}$ inches, with delicately rounded and cut leaves of the Geranioides type. It is allied to *P. vaginalata* Watt, one of the Himalayan species, but quite distinct, a more slender and dwarfer plant with fewer and very much larger flowers of a glistening satiny texture and pale shell-pink in colour. It grows in crowded colonies, forming mats many yards in extent sheeted with bloom, on stony alpine meadows, and is also seen on cliffs.

Primula effusa.—One of the Malacoides section, more of interest botanically than horticulturally. It is a plant of 6 to 12 inches, growing on moist, shady banks on a slate formation. Flowers small, pink, in superposed umbels on sprawling scapes, the leaves thickly fleshy, similar to those seen on some of the Diptera Saxifrages.

Primula dumicola.—One of the Obconica-sinolistera group. A plant of 4 to 12 inches with the inflorescence of the Malacoides type, but much stiffer and hirsute. Flowers fragrant, small, rose with yellow eye. In half shade on the margins of thickets by streams.

Primula Coryana Balf. fil. et Forrest.—First collected, though only in fruit then, in 1918. A magnificent species of the Nivalis section now in cultivation. The foliage is large, somewhat fleshy, handsomely margined with a distinct double-toothed dentation, the upper surface pale green, the under heavily silvered with aromatic farina. The scapes rise from the mass of leaves to 12 to 20 inches, bearing single, or two, sometimes three, superposed umbels; the upper portions as well as the bracts, pedicels, calyces, exterior, and a goodly portion of the interior, of the corollas heavily dusted with silvery or yellowish-grey meal. The flowers are four to seven to the umbel, drooping pendulous, very large, $1\frac{1}{2}$ to $2\frac{1}{2}$ inches across, fleshy, fragrant, in colour soft rose-lavender, rosy-purple, or soft rosy-purple.

It is found in half-shady, dampish situations, in good light, leafy loam, on the margins of rhododendron thickets or open mixed and conifer forests, or even on open meadows.

Primula caldaria.—A plant of 6 to 20 inches and the first member of the Farinosae section to occur in Yunnan. Found growing in lush meadows, or amongst dwarf scrub in the vicinity of hot springs. The flowers are fragrant, white, or white faintly flushed rose. The species is akin to *P. Knuthiana*.

Primula caldaria var. *nana*.—Resembling the type, but differing in many points. A dwarf of $\frac{1}{2}$ to 2 inches. Flowers white, fragrant. On boulders, and dry, stony pasture.

Primula aurantiaca.—A new and very distinct species of the Candelabra section, 7 to 20 inches in height. It affects moist alpine pasture and boggy situations by streams. The flowers are deep ruddy orange with deep purplish calyces, and are borne on many closely arranged superposed umbels. When in ripe fruit the scapes bend over and become rooted at the umbels, a peculiar feature seen in no other species of the genus.

Primula atrotubata.—Of the Malvaceae section. A plant of 4 to

8 inches, with flowers in single umbels or two superposed. The flowers are rather striking, deep rose, with eye and tube deep, almost black, purple-crimson. On open stony meadows and shady situations amongst scrub.

Primula aromatica.—It is doubtful what section this species belongs to. It differs from all in the Malvaceae group, though that is its nearest affinity. It is remarkable for the fragility of its leaves, which, in the fresh state, are distinctly fleshy, but when dry are of the consistency of a dried Iris bloom. It is a plant of 3 to 5 inches, with fairly large flowers, which are rose colour with the eye and tube green. The foliage is strongly fragrant and, as I have stated, is remarkably fleshy in the fresh state. It was discovered in moist situations on limy cliffs and slopes.

Primula macrostachys Balf. fil. et Forrest.—A pretty little plant of the Blattariformis type, very slender in habit, with comparatively large flowers, which are rose with yellow eye and tube.

An interesting event was the discovery of *Primula Dickieana* Watt var. *Panilengii* King, a rare plant of Sikkim. The specimens collected are 2 to 4 inches, bearing one to two or even three large fragrant flowers, deep lavender-blue in colour, with the eye yellow. There is a var. *chlorops* in the collection, with deep purple-blue flowers and having the eye and tube green, and with a greater number of blooms to the scape.

A GARDEN ON THE RIVIERA.

By E. H. WOODALL.

A GARDEN on the Riviera is such a commonplace nowadays that a little apology is needed for a description of its hackneyed glories, if one writes merely from descriptive, and not cultural or artistic, points of view.

The special delight of a spring garden on these shores arises from the fact that not only are the surroundings beautiful and the skies blue, but that the Chinese and Japanese shrubs and flowers find a climate still more congenial to their growth and perfection of flower than in the more northern climate of England. So the happy folk who garden on this coast enjoy their spring flowers six weeks or two months before their English gardens are ready for them. That is one reason of the attraction to gardeners on this coast. Another and to my mind still more potent attraction is the number of trees and shrubs that are in beauty in mid-winter without any forcing or coddling under glass. I lay much stress on this myself, because the too great tendency in modern gardening on this coast is to depend on your effects more from annual plants cleverly grown in pots in reserved plots, very often under shelter of frames or hurdles, and planted out very carefully and artistically in their allotted places just before they come into flower—Primulas, Cinerarias, Schizanthus, and Nemesias being grown by the thousand for this purpose, as successors to the Geraniums, Verbenas, and Lobelias of our youth at home. For the lover of colour effects there is much to be said for this system, but to my mind the garden in the sunny South needs to be something more than this, and to have its backbone in the Aloes and Agaves, the Oranges and Lemons, all the lovely fruit trees, both deciduous and evergreen, that abound here, backed up by the glorious trees and shrubs of Australia, Africa, China, and Japan, that are unhappy or rebellious in more northern lands.

I have not said a word about Palms, because, though I am a lover of a well-grown Date Palm with slender stem and feathery head of blue-green leaves, I cannot help protesting against the overuse of the Canary Palm, which is so luxuriant, so robust and overpowering in its brilliant green head of fronds that it is an abomination in my eyes! In its native islands, perched on top of a crag, with a splendid head towering up fully a hundred feet in the air, it is a glorious thing; but here, dwarfed and stunted, thicker and still more robust, it is a veritable eyesore! No, the native Cypress, the Ilex, and the Olive are much more in harmony with this coast, and it is a great pity to introduce such an inharmonious note. The hardy Chamaerops from the Chusan Archipelago is another instance of misdirected energy. Beautiful as a young plant, it becomes absolutely hideous when,

naked and bare and ragged, it straggles up twelve or fifteen feet with only a handful of scanty leaves atop—another thing to be avoided by all who have seen them in the Public Gardens at Nice.

There are several problems that confront the new would-be gardener : let us put one or two down on paper at once.

The most striking thing is, no doubt, the fact that there are *two periods* of growth and two of rest in the year, instead of *one*, as in the north ; and the "spring" that comes in autumn is the most precious from a gardener's point of view. So the month of October is the first month in the gardening year. August and September are the best months for pruning for winter bloom, and also for the sowing of grass seed for the winter lawns. If rain does not come, then water must be applied unceasingly to make things succeed.

If, then, there are two periods of rest—one from heat and drought in June, July and August, and the second less important rest that comes in January and February through winter rain and cold from the mountains—so there are two periods of growth : the first in November and early December, and the second in April and May, when the spring rains are abundant in some years.

This all puts a strain on the new-comer, and the wily local gardener is not slow to let you know that gardening knowledge acquired elsewhere is worthless in his eyes. Probably he will refuse to carry out your orders, to show how superior he really is. The majority of winter residents and gardeners do not come out in time for the preparation of the winter garden, and so are in their gardeners' hands. I insist indeed that, unless you are content to remain a cypher, you must begin gardening the first days of October. The ground is then hot, and when well watered, either by nature or art, everything responds in the most delightful manner ; but if you delay till the colder weather comes, plants stand still, and you lose a whole season. To give one instance : take the well-known Freesia. If you plant and water it well early in October it sprouts up green directly ; but if you wait till the end of November to plant it, most probably very few bulbs will start at all, simply because the ground is not hot enough at that period. And so it is with nearly everything.

Then there is another pitfall for beginners. You cannot transplant in December, because things are growing too fast : you must wait till the end of January or the first half of February, when things are again resting. Dig up a rose in December and you will *kill it*. Dig it up at the end of January, if it is cold weather, and it will not "turn a hair," so to say. But, of course, such transplanted shrubs will need more water by and by than those moved in September or early October. I always like to transplant rooted rose cuttings the last week of January or the first week in September.

Alphonse Karr used to say you might plant a shrub upside down and yet it would grow if it was in October !

Succulents and tender subtropical plants must be planted in late

April or during the month of May rather than in autumn ; but September seems to me the month when everything will grow when well watered. In this climate it is especially necessary to dig the ground deeply and clear it of roots. *Tree roots*, especially Eucalyptus, will travel a great distance in search of food and water, and *root action* is much greater in warm soils and climates than in the north : so the gardener must always be on the look-out lest his plants be starved by intruding roots.

I will not describe the elaborate plans necessary for the winter *bedding* garden. It is the framework that I am considering, for without that the whole thing would be worthless.

The covered walk, or *pergola*, is the very essence of the garden : it gives so many opportunities for sun- or shade-loving climbers, and protects tender things from an unkindly wave of cold that now and again invades these shores. No garden, I think, should be without an Orange or Lemon walk, where Violets can thrive in the irrigated soil. The herbaceous border, so dear to English gardeners, is a thing of extreme difficulty here, and must be replaced by flowering shrubs interspersed with Stocks, which here attain sometimes to a height of over a yard, and cleverly grouped Iris of many sorts enclosing bold clumps of bulbs—Narcissus, Tulip, and the like. These can be left untouched for two or three years, but must be thoroughly replanted, and the ground dug and manured at the end of that time, or a wilderness ensues.

The craze of the day, of course, is the " wild garden," and nowhere can it be more beautiful than on the Riviera. Fruit trees, especially Cherry trees, and Loquats and Kakis (*i.e.* Persimmons) are always to be found. Almond and Peach trees are on most terraces, and all afford both flower and framework for Wistarias and climbing Roses, while the ground underneath may be sown with Anemones if they are not already there by nature. Narcissi, especially the Tazetta or Bunch varieties, will always take care of themselves, but the northern Trumpet or Poeticus sections need renewing after three years ; their tendency is to die out unless the ground is very exceptionally moist. Indeed, I now put my best varieties in *irrigated* ground underneath the Orange or Lemon trees, not far from the Violets. Then there is the pleasure of letting your Roses ramp to their hearts' desire for a year or two ; no Northerner can have any idea of the double enjoyment it gives, both to the Rose and to the grower. "None of your over-pruned English Roses for me" will be your motto !

HENRY JOHN ELWES, F.R.S., V.M.H.

BY THE RT. HON. SIR HERBERT MAXWELL, F.R.S., V.M.H.

OF the schoolfellows whom I left at Eton in the early 'sixties, between eight and nine hundred in number, most must have passed to their rest by this time—many of them having risen to distinction in science or literature, in arms or civil life, in politics or commerce. Among them was Henry John Elwes, whose life-work, so lately brought to a close, was at once so varied and so thorough as to win for him distinction of a kind almost peculiar to himself. Born in that section of society which its detractors denounce as "the idle rich," from middle life onward an opulent landowner, to the end of his days an enthusiast in field sports, he travelled far, frequently, and adventurously, but never without a definite purpose.

My acquaintance with Elwes at Eton was slight. We were in the same school division, but boarded in different houses, and he figures in memories of that period as a handsome, dark-eyed boy, holding somewhat aloof from his schoolfellows and showing no effective interest in games. I have learnt since that he spent much of his play hours rambling through country lanes and beside the river, watching birds. Ornithology was certainly his earliest love, the first of a long series of contributions to the literature of that branch of science being a paper in the *Ibis* in 1869 on the wildfowl of the Outer Hebrides. Both Elwes and I had been entered for commission in the Scots Fusilier Guards (now the Scots Guards); but whereas he passed the prescribed examination successfully, I failed ingloriously to do so, and it was many years before we met again. Five years' service in the Army did nothing to abate or divert his keen interest in natural history, and in 1870, perusal of Hooker's fascinating "Himalayan Journals" having fired him with desire to visit India, Elwes carried it into effect with characteristic promptitude. Not only so, but, having traversed Sikkim in Hooker's footsteps to the frontier of forbidden Tibet, and having been turned back from the Donkia Pass by the Tibetan frontier guard, he slipped aside to another pass, through which he penetrated as far as the Cholamo Lake, returning from the north to Sikkim by the pass through which he had been refused passage from the south.

It was during this journey that Elwes first took serious note of trees and herbs. To his industry in ornithology he had already added the study and collection of Lepidoptera, and his fellow-traveller was the excellent naturalist W. T. Blanford; but hitherto he had devoted little or no attention to the vegetable kingdom. It was, however, impossible that so quick an observer of beauty in nature should remain insensible to the marvellously rich flora of the Sino-Himalayan

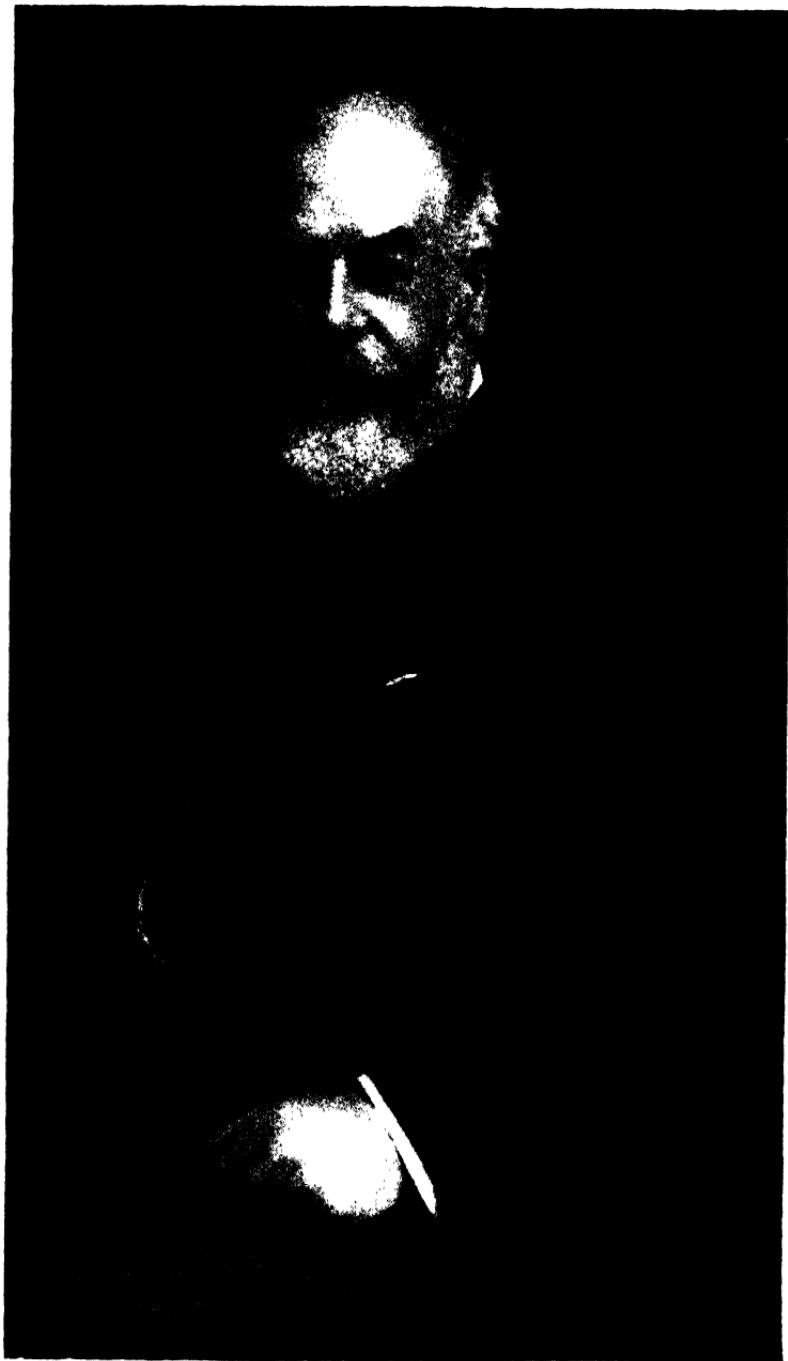


FIG. 10.—HENRY JOHN ELWES, F.R.S., V.M.H. (1846-1922).

[*To face p. 40.*

region ; wherefore, little as Elwes may have suspected it at the time, the impressions received during this year of travel proved to be the source of his subsequent services to botany and horticulture. At all events, it was not until after his marriage with Miss Lowndes-Stone in 1871 that he attempted the cultivation of garden plants. Settling at Miserden, some five miles from his father's mansion of Colesborne, Elwes employed no regular gardener, but found in the person of an old Quaker in the neighbourhood one who, by precept and example, soon aroused his interest in the care of plants. This old gentleman lived in a cottage at Painswick, where he grew some good things in a small garden and greenhouse. I wish that we knew more about these early essays in horticulture ; but I have been unable to recover any details about them. It was not till Elwes succeeded his father in Colesborne in 1891 that he was able to employ a professional gardener.

Before that time he had travelled in many lands, collecting butterflies and plants, shooting big game, and paying close attention to other forms of life, especially birds, whereof he had already, before his marriage, discovered two new species in Sikkim—namely, Elwes's crake (*Porsana bicolor*) and the horned lark (*Otocorys Elwesii*). His expedition to the Himalaya in 1870 was repeated in 1875, 1880, 1886, and 1914. The last of these journeys afforded a typical instance of the traveller's extraordinary vitality and energy. He had received in 1913 a special invitation to visit Nepal, a realm which had long been almost hermetically sealed against Europeans, and was preparing to avail himself of it when he was disabled by a painful disorder. This rendered necessary a serious operation, which, for a man in his sixty-eighth year, could not but be critical. After it was over I visited him in a nursing home. On my expressing a hope that all was going well, "Oh, well enough, well enough ! " said he ; "but, you see, they had to cut through three or four inches of fat to get at the trouble, and that makes recovery slow."

Slow ! That was in the second week of December, and he sailed for India in January. Those who listened to his lecture before the Royal Society of Arts in February 1915, giving an account of his experience in Nepal, well understood that he had not spared himself as a convalescent. He was an excellent linguist, and had acquired enough knowledge of Hindustani to enable him to converse with his carriers, who became devoted to him.

To furnish a complete itinerary of this most energetic ex-Guardsman would baffle any attempt on my part. His travels lay in Asia four times ; in North America and Mexico three times ; in Russia and Siberia three times. He visited Japan, China, and Formosa twice and Chile once ; but his journeys to wellnigh every part of Europe were practically innumerable, and invariably resulted in the introduction of interesting plants, many of which were new to science. He contributed many species to the Botanical Gardens of Kew and Edinburgh. It is noted in the *Kew Bulletin* that his

first gift to the Royal Gardens consisted of fifteen herbaceous plants in July 1872, and his last, fifty years later, in August 1922, four months before his death on November 26.

The enterprise and diligence of collectors during the last five-and-thirty years have resulted in the introduction to this country of a greater number and variety of hardy exotics than in any similar space of time. In no genus have so many new species been discovered, described, and cultivated as in that of *Rhododendron*, and Elwes cannot have remained insensible to the splendour of some of them during his travels in the Himalaya. Had Colesborne been situated on the greensand, or in some sheltered dale of the west, we may imagine the enthusiasm with which he would have embarked on a collection of them. But his lines were cast on a Cotswold upland, where a cold cretaceous soil prohibits success with that most fascinating family of plants. Elwes knew better than to attempt it, and perhaps horticultural science was no loser through the limitations inherent in oölitic rock, which caused him to concentrate attention upon other natural orders. The general scope of his contributions to horticultural science may be roughly gauged by the fact that no private garden has provided so many subjects for illustration and description in the *Botanical Magazine* as that of Colesborne. It gratified Elwes to know, shortly before his death, that the number of species contributed by him to that venerable periodical had reached one hundred.

That, however, was far from being the only service he rendered to the *Botanical Magazine*, for when in 1921 it was at the point of death—nay, after it had actually ceased to exist—it was largely owing to Elwes's liberal aid that it was found possible to resuscitate it by raising the sum required for purchase of the copyright. Nor should Fellows of the Royal Horticultural Society forget that he contributed £1,000 towards the cost of building their Hall in Vincent Square.

It would be impossible, within the limits of this notice, to enumerate all the papers on horticulture and botany written by Elwes for transactions and journals of various scientific societies; but his name must always be associated with two works of outstanding value—each, it may be noted, on a scale commensurate with his powerful physique.

The earlier of these was a magnificent folio, "Monograph of the Genus *Lilium*," published in 1880, the botanical details being supplied by J. G. Baker, for Elwes never pretended to be a technical botanist. Failing health interfered to thwart his earnest desire to publish a supplement dealing with the species discovered or identified in the last forty years, a task which has now been undertaken by Dame Alice Godman in collaboration with Mr. Arthur Grove.

Elwes's other great work was undertaken jointly with Professor Augustine Henry as botanical *collaborateur*. The title of these mighty tomes, "The Trees of Great Britain and Ireland," affords scant indication of their scope, forasmuch as it is not only indigenous species that are described and illustrated, but all trees that had been success-

fully cultivated in any part of our country. The first volume was published in 1906, the seventh and last in 1913. To compose and write the descriptive and historical matter which fills upwards of two thousand pages in quarto would suffice to test the powers and diligence of any pair of authors ; but the task was rendered exceptionally arduous by long journeys to inspect forests in all parts of Europe, in Asia, North Africa, and North and South America, besides visits to almost every county in Great Britain and Ireland, taking photographs and measurements wherever they went. For instance, having heard about two oaks—natural hybrids—near Grasse in Provence, off went Elwes at once to verify the report, for he never would take anything on hearsay. Again, in April 1909 he went to Portugal to satisfy himself that the Mexican or Goa cypress (*Cupressus lusitanica*) was actually naturalized in the forest of Bussaco.

It will be long before we cease to miss the presence of Elwes at the fortnightly meetings of the R.H.S., where he was wont to be conspicuous, both on account of his massive stature and handsome, well-bearded countenance, ensuring for him in any company—

“*Digitō monstrari, et dicere hic est.*”

and by his deep, resounding voice that tended to dominate discussion. That voice gave rise to an amusing incident when, several years ago, a party of the English Arboricultural Society visited the woods of Perthshire under invitation from the Scottish Arboricultural Society. Elwes, as President of the English Society, was a prominent figure in the party, commenting freely upon what he saw. In the course of the second day's peregrination one Scottish forester, indicating Elwes to a companion, was overheard to ask him, “I say, is that a man or a gramophone ? ”

Elwes spoke from fullness of knowledge and ripe experience, and if at times his eager emphasis seemed to denote impatience with the opinions of others, none was more grateful than he for sound information from those who could give it—none readier to own up when he was in the wrong.

Many of us feel that we have parted with a warm-hearted, open-handed friend, and that horticulture and sylviculture have lost a foremost pioneer and ready craftsman in Henry John Elwes, of whom it may justly be said :

“*Strenuus vixit : fortis obiit.*”

The long list of plants figured in the *Botanical Magazine* from specimens grown by Mr. Elwes at Colesborne, and in many cases collected by him, which we are able to give overleaf will serve to illustrate the part he played in introducing new plants to our gardens and the keenness of his eye for the good plants he found on his travels. Some of them are very widely known and grown, like *Chionodoxa Luciliae*, and some are more particular in their likes and less accommodating, but few lack beauty and that appearance of “race” which so recommends a plant to the garden lover.

PLANTS INTRODUCED OR GROWN BY H. J. ELWES FIGURED IN THE
Botanical Magazine.

The species collected by himself are indicated by an asterisk.

Year.	Plate.	Name.	Native Country.
1875.	*6166	<i>Galanthus Elwesii</i>	Asia Minor
	*6168	<i>Crocus Crewei</i>	Syra Island
	*6176	<i>Crocus Fleischeri</i>	Asia Minor
	*6187	<i>Crocus Boryi</i>	Asia Minor
	*6191	<i>Tulipa Eichleri</i>	Asia Minor
	6200	<i>Calochortus citrinus</i>	California
1876.	6242	<i>Tulipa Hageri</i>	Greece
	*6244	<i>Bongardia Rauwolfii</i>	Asia Minor
	6255	<i>Serapias papilionaceo-lingua</i>	Southern France
	6269	<i>Muscari aestival</i>	
1877.	6281	<i>Dracocephalum speciosum</i>	Sikkim
	6295	<i>Tigridia lutea</i>	S. America
	*6308	<i>Tulipa undulatifolia</i>	Asia Minor
	*6321	<i>Fritillaria acmopetala</i>	Asia Minor
	*	<i>Fritillaria dasypylla</i>	Asia Minor
	6335	<i>Gladiolus Eckloni</i>	S. Africa
1878.	*6343	<i>Iris cretensis</i>	Asia Minor
	6371	<i>Fritillaria Sewertzowi</i>	Turkestan
	6374	<i>Tulipa saxatilis</i>	Crete
	*6385	<i>Fritillaria Hookeri</i>	Sikkim
	*6388	<i>Pleione Hookeriana</i>	Sikkim
1879.	*6433	<i>Chionodoxa Luciliae</i>	Asia Minor
	6444	<i>Bomarea acutifolia</i>	S. America
	*6446	<i>Arisacma nepenthoides</i>	Sikkim
	6453	<i>Chionodoxa nana</i>	Crete
1880.	*6474	<i>Arisaema utile</i>	Sikkim
	6475	<i>Calochortus Benthamii</i>	California
	*6491	<i>Arisaema Griffithii</i>	Sikkim
	6529	<i>Disa megaceras</i>	S. Africa
1881.	6562	<i>Hymenocallis Harrisiana</i>	Mexico
	6569	<i>Kniphofia comosa</i>	Abyssinia
1882.	*6625	<i>Satyrium nepalense</i>	Sikkim
	*6638	<i>Hedychium gracile</i>	Sikkim
1883.	6710	<i>Tulipa Kolpakowskyana</i>	Turkestan
	*6718	<i>Aster diplostephoides</i>	Sikkim
1884.	*6732	<i>Primula prolifera</i>	Sikkim
	6742	<i>Kniphofia foliosa</i>	Abyssinia
	6754	<i>Tulipa Kesselringii</i>	Turkestan
	6761	<i>Tulipa Albertii</i>	Turkestan
	*6786	<i>Tulipa primulina</i>	Algeria
	*6789	<i>Allium macranthum</i>	Chumbi Valley
1886.	6887	<i>Tulipa Kaufmanniana</i>	Turkestan

Year.	Plate.	Name.	Native Country.
1886.	6896	Corydalis Sewerzowi	Central Asia
	6900	Leontice Albertii	Central Asia
	6901	Colchicum Troodii	Cyprus
1889.	7080	Fritillaria bucharica	Central Asia
	7082	Shortia galacifolia	N. America
1890.	7111	Iris orchoides	Central Asia
	*7116	Berberis virescens	Sikkim
	*7148	Rhodostachys andina	Chile
1892.	7251	Iris Lortetii	Syria
	7253	Tulipa Billietiana	Savoy
1893.	7289	Satyrium coriifolium var. maculatum	S. Africa
	7319	Cypripedium montanum	California
1894.	7379	Iris atropurpurea var. atrofusca	Palestine
1895.	7403	Disa sagittalis	S. Africa
1896.	7478	Habenaria Elwesii	S. India
1900.	*7746	Cypripedium guttatum	Altai Mountains
1904.	7935	Arethusa sinensis	China
	*7055	Chloraea crispa	Chile
1906.	*8054	Oxalis adenophylla	Chile
	*8100	Chloraea virescens	Chile
1907.	*8115	Tricuspidaria dependens	Chile
	*8125	Calophora coronata	Chile
1908.	8178	Codonopsis convolvulacea	N.W. Himalaya
	8188	Kaempferia Kirkii var. clatior	Rhodesia
1909.	*8277	Cereus amecamensis	Mexico
1910.	*8314	Nothofagus antarctica var. uliginosa	Chile
1911.	8373	Deinanthe coerulea	China
1912.	8415	Disa lugens	S. Africa
	8429	Agave protuberans	Mexico
1914.	*8560	Tricyrtis stolonifera	Formosa
	*8570	Zingiber Mioga	Japan
1915.	*8614	Hippeastrum Elwesii	Chile
	8630	Gentiana gracilipes	China
1916.	8642	Eria ornata	Borneo
	*8651	Alpinia Elwesii	Formosa
1917.	*8729	Pleione Pricei	Formosa
	8730	Castilleja miniata	N.W. America
	8731	Orthrosanthus chimboracensis	S. America
1918.	*8753	Odontochilus lanceolatus	Sikkim
1919.	*8797	Liparis macrantha	Formosa
	8803	Calanthe tricarinata	Himalaya
1920.	8848	Salvia brevilabia	China
	8850	Podophyllum Emodi var. chinense	China
	8858	Allium sikkimense	Sikkim
	8870	Phlomis spectabilis	Himalaya
1922.	8937	Mesembryanthemum fragrans	S. Africa

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Year.	Plate.	Name.	Native Country.
1922.	8938	<i>Aeschynanthus sikkimensis</i>	India
	8947	<i>Euphorbia anoplia</i>	S. Africa
	8965	<i>Cypripedium himalaicum</i>	Himalaya and West China
	8968	<i>Hemerocallis nana</i>	China
	8971	<i>Echinocereus Baileyi</i>	N. America
	8975	<i>Haemanthus Lynesii</i>	Sudan
1923.	8982	<i>Caralluma pseudo-N.E. Brownii</i>	S. Africa
	8985	<i>Sempervivella alba</i>	Himalaya
	9006	<i>Lysionotus pauciflorus</i>	China

NEW OR NOTEWORTHY PLANTS IN THE SOCIETY'S
GARDENS, V.

By F. J. CHITTENDEN, F.L.S., V.M.H.

15. SEDUM PRUINATUM *Brotero.*

THIS curious Portuguese plant is described and figured in Mr. Lloyd Praeger's account of Sedums in this JOURNAL, vol. 46, p. 277. It came to us from Miss Luckham, who, having collected it in Portugal, sent pieces to Wisley in 1915, where on the rock garden it has flourished and whence plants have been distributed to many other gardens. It appears to be rare in its native country, and was apparently unknown in gardens until Miss Luckham introduced it. It grows freely in well-drained places or in the chinks of walls or rocks, which suit the British species *S. rupestre* (which it is quite unlike, but with which it has been confused), and is a plant for the lover of the curious rather than for him who is content with a great patch of colour.

Its leaves are very grey, its rather meagre flowers pale lemon on long, thin stalks, its habit of rooting at the tips and straying thus from its original station rather disturbing, but interesting as a method of local distribution; but most curious and interesting is its method of folding its long grey leaves into a tight bunch near and over the tip of the stem, so that its summer aspect is that of grey wisps upon the rock face. In the moister parts of the year it opens out and loses its look of a dead, discarded shoot.

16. BERBERIS REPLICATA *W. W. Smith* (fig. 13).

Our conception of the genus Berberis has been greatly enlarged by explorations in W. China. Species of this genus are found in practically all temperate climates, except the south temperate regions of the Old World, but nowhere else are there so many to be found. It seems, indeed, that they are as diverse as the blackberries here, and even more so, for there are evergreen, sub-evergreen, and deciduous forms in great variety. Perhaps the best of these evergreen forms is *B. verruculosa*, but that has no beauty of flower to recommend it. *B. replicata*, on the contrary, bears numerous flowers all along its arching branches quite early in spring—sometimes in February or early March; it flowers very early in its life, and if undisturbed will seed itself about. It is quite distinct, too, in its evergreen foliage, which is long, and scarcely one-fifth of an inch wide, partly because the spiny margins are turned down, sometimes so much as to hide the spines. The upper surface of the leaf is deep green, and below it may be white or green, with a prominent yellowish

midrib, while the young stems and short spines are pale yellow. The bush is said eventually to reach 5 feet in height. Few plants can have attained that height in England yet—the largest at Wisley are about 3 feet. Mr. George Forrest collected the plant in four places near Tengyueh in 1912 and 1913, but the plants in cultivation to-day came from seed which he collected in October 1917 on the Shweli-Salween divide, lat. $25^{\circ} 30' N.$, at an altitude of 11,000 feet, where (like the earlier specimens) this was growing in open scrub. His specimen was labelled F 16030, and seedlings have been distributed from Wisley under this number and our serial numbers A 137, 168, 546.

17. RHODODENDRON LUTESCENS Fr. (fig. 14).

Yellow is so rare a colour among evergreen Rhododendrons that species bearing yellow flowers are especially interesting. *Rhododendron lutescens* is one, and although it is not particularly new to English gardens (it was introduced by Mr. E. H. Wilson from Western China in 1904), it is still noteworthy on account of its early-flowering habit and its uncommon colour. In the early spring of 1923 at Wisley it flowered well, the bushes both in the open and in the light shade of the trees being covered more than usual with the 1-inch-wide flowers which are produced in ones or twos from the buds towards the end of the previous season's growths. The bushes are now about 4 to 5 feet in height, rather upright, and somewhat thin, a character emphasized by the long (3½ inches), narrow, pointed leaves. The shade of colour varies a good deal in different seedlings, the poorest being almost primrose, with the green tinge of primrose very pronounced, the best being of a more solid shade, and altogether more pleasing.

18. SPENCERIA RAMALANA Trim.

This Chinese plant was discovered as long ago as 1877, when Captain William Gill, R.E., collected it close to the Tibetan frontier. Trimen described and figured it in the *Journal of Botany*, 17, p. 97 (1879), deriving the specific name from Ra-ma-la, the name of the mountain on which Gill collected it at an elevation of 14,335 feet. It was not introduced to cultivation until long afterwards, and most, if not all, of the plants now growing in the British Isles are derived from the seed received here in February, March, and June, 1919, which Mr. Forrest sent home on his 1917-19 expedition. The seed germinated freely, and both seeds and plants have been distributed widely from Wisley under the serial numbers A 1130, A 1250, and A 1829; but the seed was not accompanied by any field-notes from Forrest, so the exact locality of collection is doubtful.

The plant is a fit subject for a nook of the rock garden, and calls for nothing special in the way of soil or aspect, being perfectly hardy. It forms a rosette of leaves lying more or less flat on the ground, and

[*F*ig. 48.]

FIG. 48.—*PETORIA CALABRICA* AT WISLEY. (See R.H.S. JOURNAL, 48, p. 234.)





FIG. 12.—*VIBURNUM CARLESHI* AT WISLEY.

(See R.H.S. JOURNAL, 48, p. 227.)

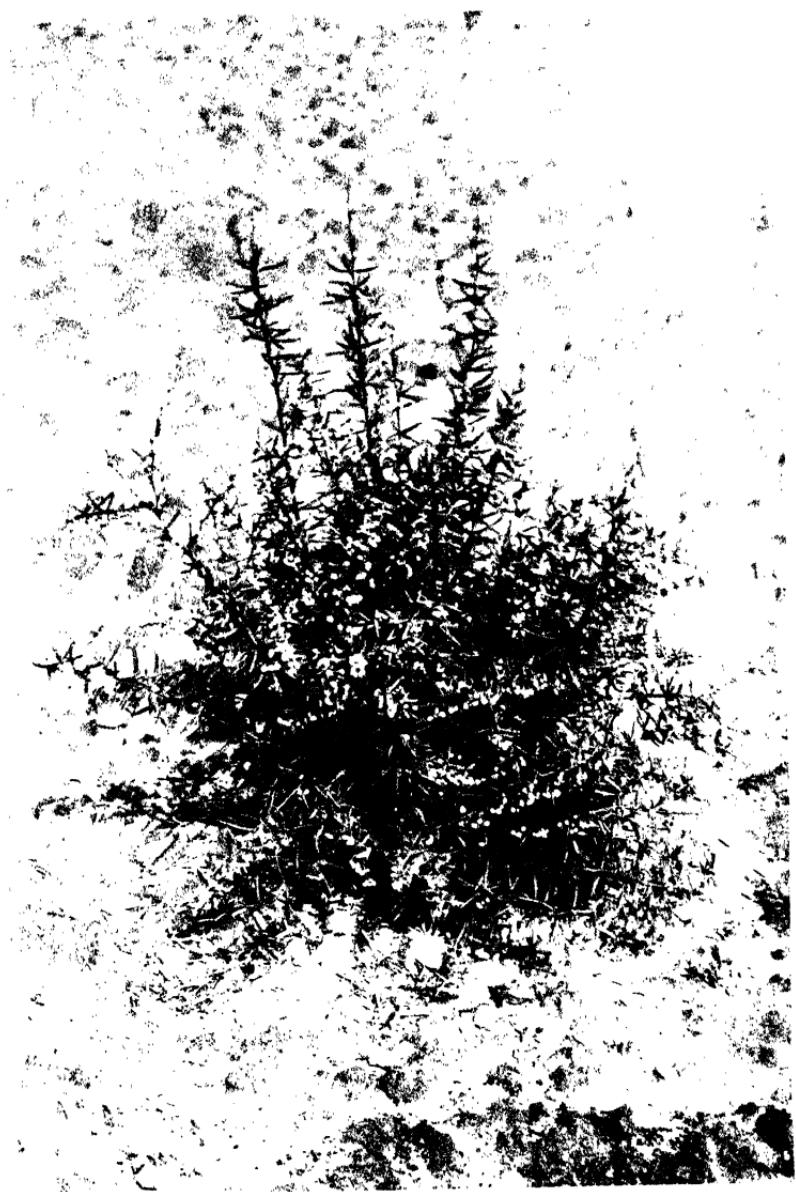


FIG. 13.—*BERBERIS REPLICATA* AT WISLEY.



FIG. 14.—*RHODODENDRON LUTESCENS* AT WISLEY.

[To face p. 49.]

rising from the centre is a spike of large bright yellow flowers, very much like those of a *Potentilla*. Its habit is much that of the common Agrimony, to which indeed it is closely allied, but the size and brightness of its flowers render it a good garden plant.

19. *PRIMULA FASCICULATA* *Balf. fil. et Ward.*

Comparatively few of the vast array of *Primulas* which have come out of Eastern Asia are likely to find permanent homes in our gardens at present, great as the welcome they would be sure to receive, for *Primulas* have a charm for nearly all. Too many of them are biennial; some of them require a fungus partner which we cannot yet provide; others have likings which, so far, we do not apprehend; a few, like the subject of this note, are perennial and appear likely to settle down as well as most of the European species do in our rock gardens.

Primula fasciculata lives in Yunnan. It was first collected on the Chungtien plateau, at an elevation of 11,000-12,000 feet, in May 1913, by Mr. F. Kingdon Ward, who found it covering bogs there with its deep rose-pink, orange-eyed flowers.

Seed was collected and sent home by Mr. George Forrest in Yunnan in 1918, and germinated well at Wisley. The plants were at first grown in frames in pans and flowered freely in spring there, and subsequently the same plants flowered for two successive years in the Alpine house, and are still growing freely. Others were planted out on the rock garden in a moist but well-drained place, not very shaded, where they grew well, and came safely through the winter, to flower in May 1923. Seed has been saved from these plants and seedlings raised. The original plants are growing freely still. The species in the top left-hand corner of the illustration is *P. frondosa*. *P. fasciculata* bears numbers of flowers, each on a stalk of about 2 inches, rising directly from the rosette of $\frac{3}{4}$ -inch-long oblong leaves. The flowers are just under $\frac{1}{2}$ inch across, and the petals are deeply notched. The flowers vary, however, in the depth of the notching, and to some extent in the depth of the rose-pink colouring. All have the bright orange eye which contrasts very pleasantly with the rest of the corolla.

An Award of Merit was given this plant when exhibited at Vincent Square from Wisley on May 9, 1922, and plants have been distributed under the serial number A 1105; but Forrest's collection was unaccompanied by any notes. It seems likely to be a permanent addition to our gardens where *P. farinosa* and *P. frondosa* will grow, perhaps more perennial than the former, and at least as beautiful.

GARDEN DAHLIAS.

WHEN, in 1921, a representative collection of Dahlias was grown in the R.H.S. Gardens at Wisley for the primary purpose of selecting those best adapted for garden decoration, a Conference was held to which members of the National Dahlia Society were invited and a classification was arrived at which was set out in our JOURNAL, vol. 47, pp. 56-73. This classification was based mainly upon the form of the flower-heads, and this is dependent upon the degree of development of ray florets, and the amount and kind of rolling or flattening out which these assume. Size both of plant and flower-head has also to be taken into account. The classification has proved sufficient in subsequent years, and varieties can usually be assigned to their respective classes with ease.

It was not possible when that classification was first published to illustrate the different classes by means of figures of typical flowers, but we are now able to do this, and the opportunity is taken to give a list of the varieties belonging to each class and to which awards have been given after trial at Wisley. Most of these may be seen growing at Wisley in the summer.

The lists which follow show the characters of the classes, and, in each class, the name, raiser (or sender), and colour of each variety that has obtained an Award of Merit after trial at Wisley, and a reference to its full description in our JOURNAL.

Class I. SINGLE DAHLIAS.

Single Dahlias have a single regular outer ring of flatly expanded rays which overlap more or less at their edges; the centre forms a golden disc.

Class IA. SHOW SINGLE DAHLIAS (figure 15).

Show Single Dahlias should not exceed 3 inches in diameter, and the eight (only) ray florets must be smooth, somewhat recurved at the tips, broad and overlapping so as to form a perfectly round flower.

Mamie (Cheal of Crawley), A.M. Carmine-rose with crimson-maroon ring.
See vol. 48, p. 99, and vol. 49, p. 62.

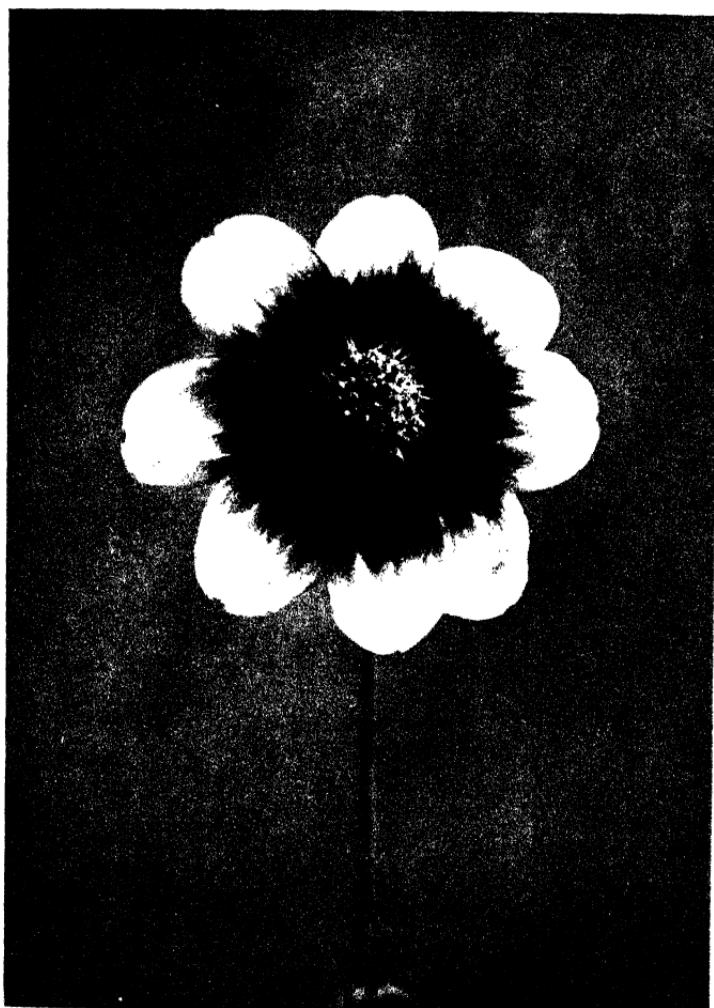


FIG. 15.—SHOW SINGLE DAHLIA 'MAMIE.'
Carmine-rose with crimson-maroon ring. An example of Class I.A.



FIG. 16.-DECORATIVE SINGLE DAHLIA 'BISHOP CROSSLEY.'
Scarlet. An example of Classes I B and II.

Class IB. DECORATIVE SINGLE DAHLIAS (figure 16).

Decorative Single Dahlias have the ray florets touching for only about three-quarters of their length, the tips being separated so that the flower forms an eight-pointed star.

Clematis (Treseder of Cardiff), **A.M.** Light phlox-purple (mauve). See vol. 47, p. 58 and vol. 48, p. 99.

Bishop Crossley (Treseder), **A.M.** Scarlet. See vol. 47, p. 58, and vol. 48, p. 99.

Suse (Treseder), **A.M.** Scarlet. See vol. 47, p. 58.

F. Graham Bird (Treseder), **A.M.** Scarlet. See p. 63.

Class II. MIGNON SINGLE DAHLIAS.

Flowers similar in all respects to Class I. (figs. 15, 16), but the plants do not exceed 18 inches in height.

Albion (Cheal), **A.M.** Ivory with lemon base. See vol. 48, p. 99.

Janet (Cheal), **A.M.** Orange. See vol. 48, p. 100.

Coltness Gem (Purdie of Glasgow), **A.M.** Scarlet. See vol. 48, p. 100, and vol. 49, p. 63.

Class III. COLLERETTE DAHLIAS (figure 17).

Collerette Dahlias have an outer ring of flat rays as in Singles, and just within this and surrounding the golden disc a ring of florets (the 'collar') with deeply cut petals, generally of a different colour from the outer, and only about half their length.

Linnet (Dobbie of Edinburgh), **A.M.** Crimson-carmine, collar white and magenta. See vol. 47, p. 60, and vol. 48, p. 100.

Rona (Dobbie), **A.M.** Bright crimson and white, collar yellow. See vol. 48, p. 100.

Tuskar (Dobbie), **A.M.** Deep rosy crimson-maroon, collar cream and crimson. See vol. 47, p. 60, and vol. 48, p. 100.

Lolah (Burrell of Cambridge), **A.M.** Orange-scarlet, collar pale lemon and orange. See vol. 47, p. 60, and vol. 48, p. 100.

Cyril (Treseder), **A.M.** Cardinal with yellow tips, collar pale lemon. See vol. 47, p. 60.

Scarlet Queen (Dobbie), **A.M.** Deep scarlet, collar with few lemon streaks. See vol. 47, p. 60, and vol. 48, p. 100.

Hussar (Dobbie), **A.M.** Crimson-scarlet, collar tipped white. See vol. 47, p. 61.

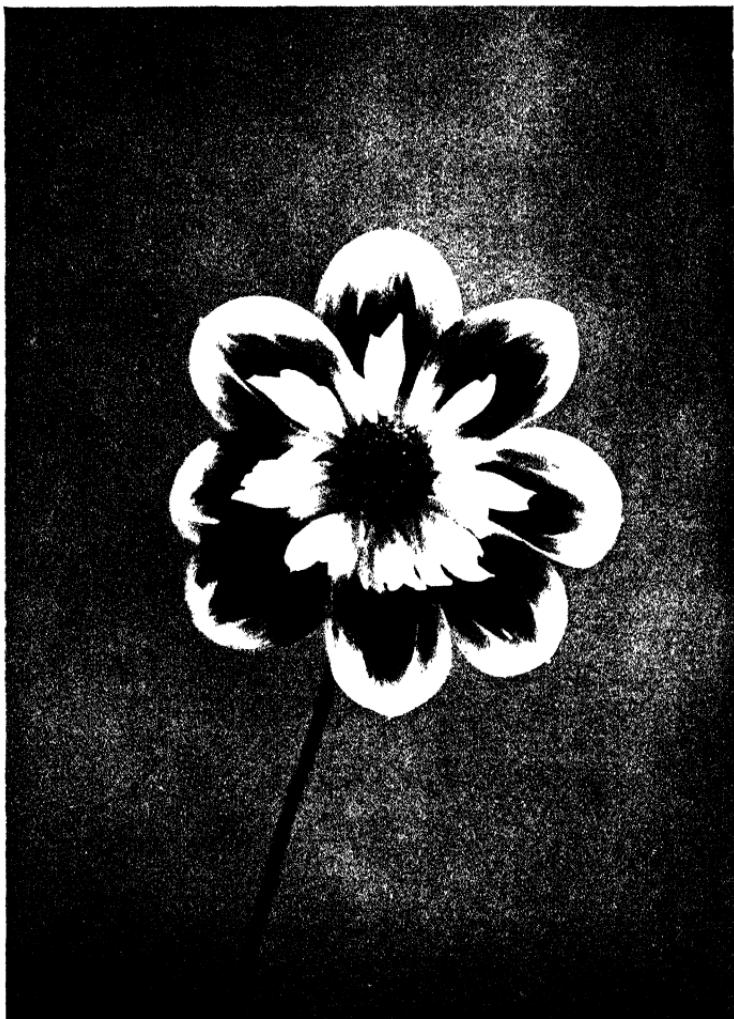


FIG. 17.—COLIERETTE DAHLIA 'TUSKAR.'
Crimson-maroon with creamy collar. An example of Class III.

[To face p. 52.]



FIG. 18.—ANEMONE-FLOWERED DAHLIA 'MAISSONIA.'
Pink. An example of Class IV.

Class IV. ANEMONE-FLOWERED DAHLIAS (figure 18).

In Anemone-flowered Dahlias the outer ring of flattened rays surrounds a dense group of tubular flowers, longer than the ordinary disc florets of the single-flowered class and of a different colour.

No awards of merit have been given in this class.

Class V. PÆONY-FLOWERED DAHLIAS (figure 19).

The Pæony-flowered Dahlias have large flowers consisting of three or four rows of flattened expanded rays somewhat irregularly arranged and surrounding a golden disc similar to that of the singles. (The earlier flowers are sometimes without the disc.)

Aphrodite (Turner of Slough), **A.M.** White. See vol. 47, p. 62, and vol. 48, p. 101.
Faithful (Burrell), **A.M.** Pale yellow. See vol. 48, p. 101.
Psyche (Burrell), **A.M.** Bright deep yellow. See vol. 48, p. 101.
King of the Autumn (Bath of Wisbech), **A.M.** Pale buff. See vol. 47, p. 62.
Enchantress (Burrell), **A.M.** Rose on yellow. See vol. 47, p. 63, and vol. 48, p. 101.
Ladysmith (Dobbie), **A.M.** Bright rosy magenta. See vol. 47, p. 63.
Vesuvius (Velthuys of Holland), **A.M.** Bright scarlet. See vol. 48, p. 102, and vol. 49, p. 63.
Scarlet King (Burrell), **A.M.** Bright scarlet. See vol. 47, p. 63, and vol. 48, p. 102.

Class VI. SMALL-FLOWERED PÆONY-FLOWERED DAHLIAS (figure 19).

The flowers are in essentials like those of Class V., but are smaller.

Our Annie (Burrell), **A.M.** Apricot-yellow flushed pink. See vol. 47, p. 64.
Peach (Burrell), **A.M.** Light mallow-purple on yellow. See p. 64.
Mac (Burrell), **A.M.** Amaranth-pink on orange. See p. 64.
Denys (Burrell), **A.M.** Scarlet. See p. 64.
Crimson Glow (Burrell), **A.M.** Crimson-scarlet. See p. 64.

Class VII. DWARF PÆONY-FLOWERED DAHLIAS (figure 19).

Similar to Classes V. and VI., but not exceeding 2 feet 6 inches in height.

Charlotte (Dobbie), **A.M.** Orange-salmon. See vol. 47, p. 65.

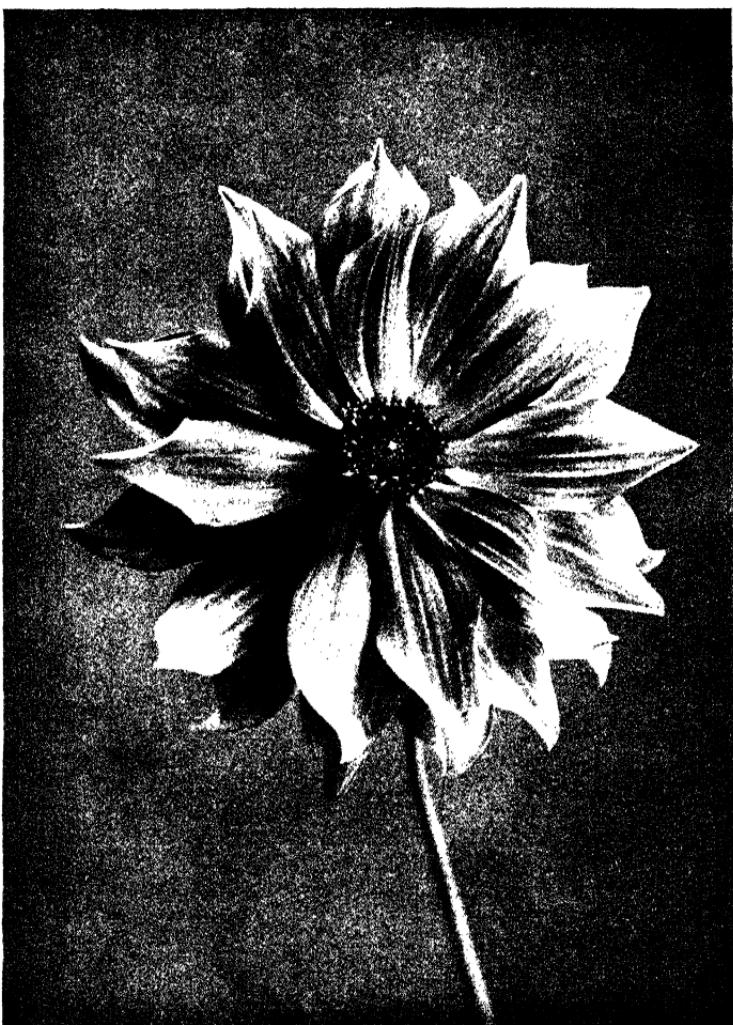


FIG. 19.-PEONY-FLOWERED DAHLIA 'NORAH BELL.'
Orange-scarlet. An example of Classes V., VI., and VII.



FIG. 20.—DECORATIVE DAHLIA 'MRS. COURTNEY PAGE.'
Pale mallow-purple. An example of Class VIII.

Class VIII. DECORATIVE DAHLIAS (figure 20).

Flower heads like Class V., but centre filled with ray florets and without a yellow disc.

Bianca (Turner), **A.M.** Pure white. See vol. 47, p. 65.
Mrs. Courtney Page (Burrell), **A.M.** Very pale mallow-purple. See vol. 48, p. 103.
Nancy (Burrell), **A.M.** Amaranth pink. See vol. 47, p. 66.
Hanny van Waveren (van Waveren of Hillegom), **A.M.** Amaranth-pink. See vol. 48, p. 103.
Salmonea (Velthuys), **A.M.** Salmon-pink. See vol. 48, p. 103.

Class IX. SMALL-FLOWERED DECORATIVE DAHLIAS (figure 20).

Like Class VIII., but heads small.

Juweltze (Den Olden, Leiden), **A.M.** Mallow-pink. See p. 65.
Ralder (Burrell), **A.M.** Grenadine on orange. See p. 65.
Vida (Burrell), **A.M.** Apricot shaded orange. See vol. 48, p. 103.
Aglaia (Burrell), **A.M.** Orange shaded deep apricot. See vol. 48, p. 103.
Tipsy (Burrell), **A.M.** Bright scarlet. See p. 65.

Class X. DWARF DECORATIVE DAHLIAS (figure 20).

The counterpart of Class VIII. in everything but height, which does not exceed 3 feet.

No awards of merit have been given in this class.

Class XI. CAMELLIA-FLOWERED DAHLIAS (figure 21).

Fully double (without yellow disc); rays regularly arranged with margins incurved so as to form wide-mouthed tubes with their mouths lengthened and tips generally pointed.

Fedora (Burrell), **A.M.** Mallow-purple on orange. See vol. 48, p. 104.

Apricot (Cheal), **A.M.** Yellow flushed apricot. See vol. 47, p. 68.

Mrs. F. J. Sage (Burrell), **A.M.** Bright scarlet. See vol. 48, p. 104.

Radium (Thoday of Stoke Bishop), **A.M.** Crimson scarlet. See p. 65.

Crimson Flag (Cheal), **A.M.** Crimson scarlet. See vol. 47, p. 68.

Reginald Cory (Cheal), **A.M.** Scarlet, tipped creamy white. See vol. 47, p. 68.



FIG. 21.—CAMELLIA-FLOWERED DAHLIA 'FEDORA.'
Mallow-purple on orange ground. An example of Class XI.

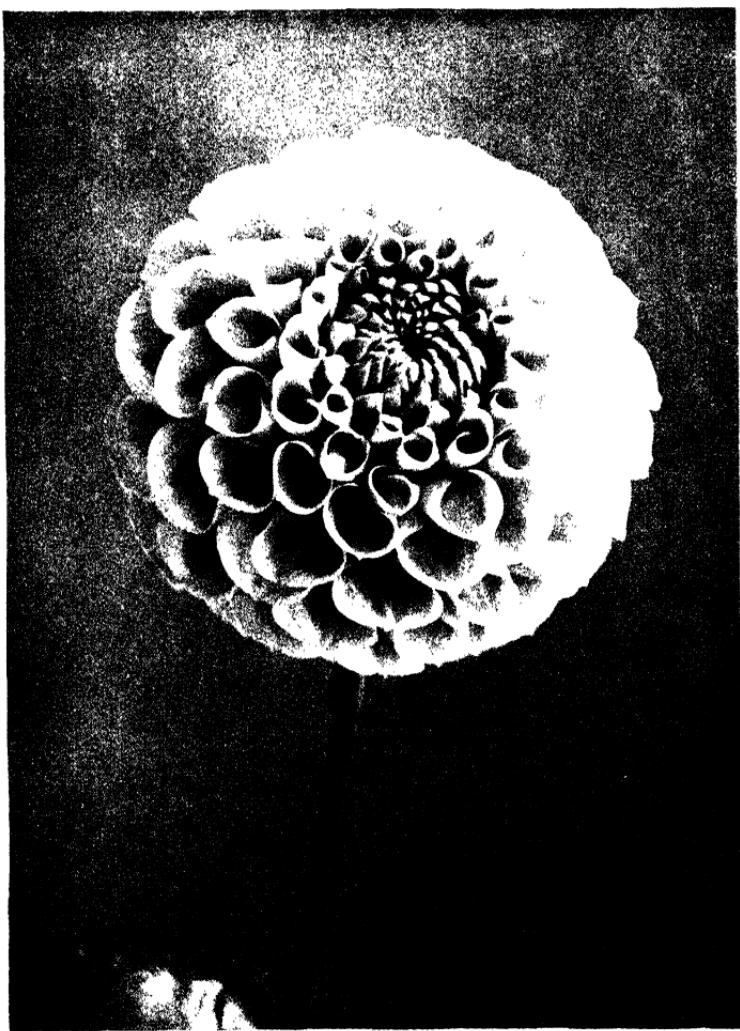


FIG. 22.—SHOW DAHLIA 'DOREEN.'
Pale amaranth-pink An example of Class XII.

Class XII. SHOW DAHLIAS (figure 22).

Fully double, over 3 inches in diameter, almost globular, centre florets like outer but smaller, with margins incurved, tubular, short and blunt at mouth. This Class includes the old 'Fancy' Dahlias, which had each floret tipped with white or striped.

Doreen (Cheal), A.M. Pale amaranth-pink. See vol. 48, p. 104.
Merlin (Turner), A.M. Orange scarlet. See vol. 47, p. 69.

Class XIII. POMPON DAHLIAS (figure 23).

Like Class XII. but smaller (generally about 2 to 2½ inches in diameter).

Albin (Godfrey of Exmouth), **A.M.** White. See vol. 47, p. 69.
Nerissa (Turner), **A.M.** Mallow purple. See vol. 47, p. 69.
Glow (Cheal), **A.M.** Coral-red. See vol. 47, p. 69, and vol. 49, p. 65.
Mars (Turner), **A.M.** Scarlet. See vol. 47, p. 70.
Tommy Laing (Dobbie), **A.M.** Purplish maroon, tipped white. See vol. 47, p. 70.

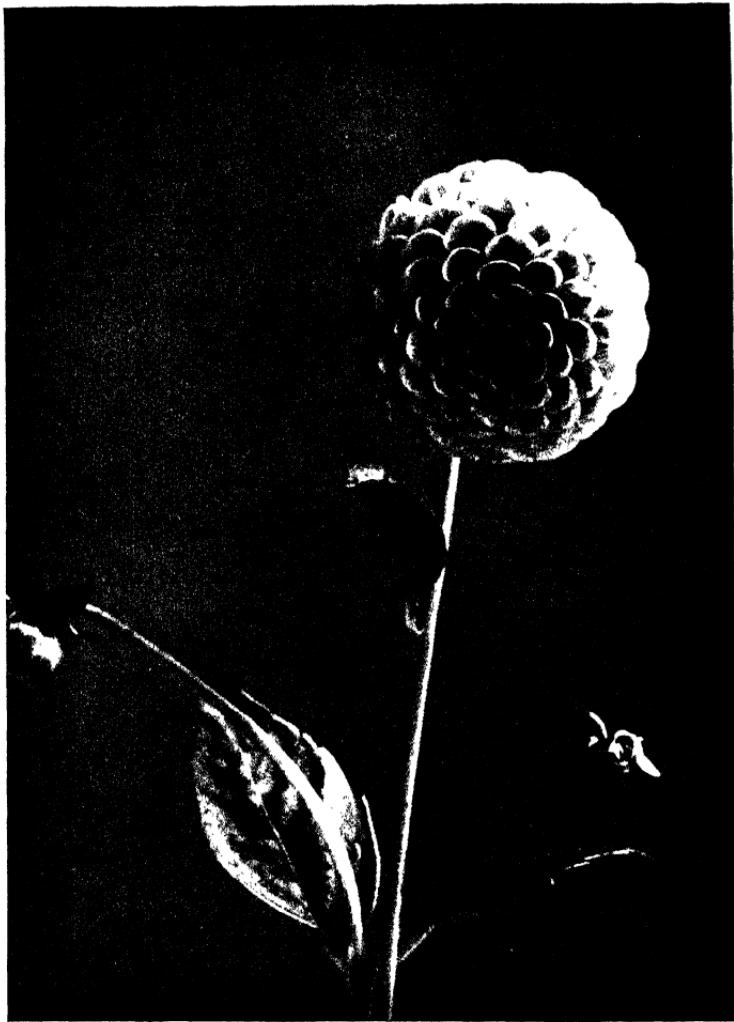


FIG. 23.—POMPON DAHLIA 'NEFISSA.'
Mallow purple. An example of Class XIII.

[To face p. 58.]



FIG. 24.—STAR DAHLIA 'WHITE STAR.'
White. An example of Class XIV.

Class XIV. STAR DAHLIAS (figure 24).

Small, with two to four rows of rays, not or scarcely overlapping at their more or less recurved margins, and forming a cup-shaped flower with a golden disc.

White Star (Cheal), **A.M.** White. See vol. 47, p. 70.

Gatton Star (Cheal), **A.M.** Rosy salmon, tipped mallow-purple. See p. 66.

Felicia (Turner), **A.M.** Bright rosy-pink. See vol. 47, p. 71.

Surrey Star (Cheal) **A.M.** Orange suffused pink. See vol. 47, p. 71.

Leda (Turner), **A.M.** Orange and pink. See vol. 47, p. 71.

Class XV. CACTUS DAHLIAS.

Florets long, spreading, and often twisted, with their margins recurved.

(a). Double, with florets all alike (figure 25).

Jhr. G. van Tets (Jan Kriest of Leiden), **A.M.** White. See p. 66.
Snowdrift (Turner), **A.M.** White. See p. 66.

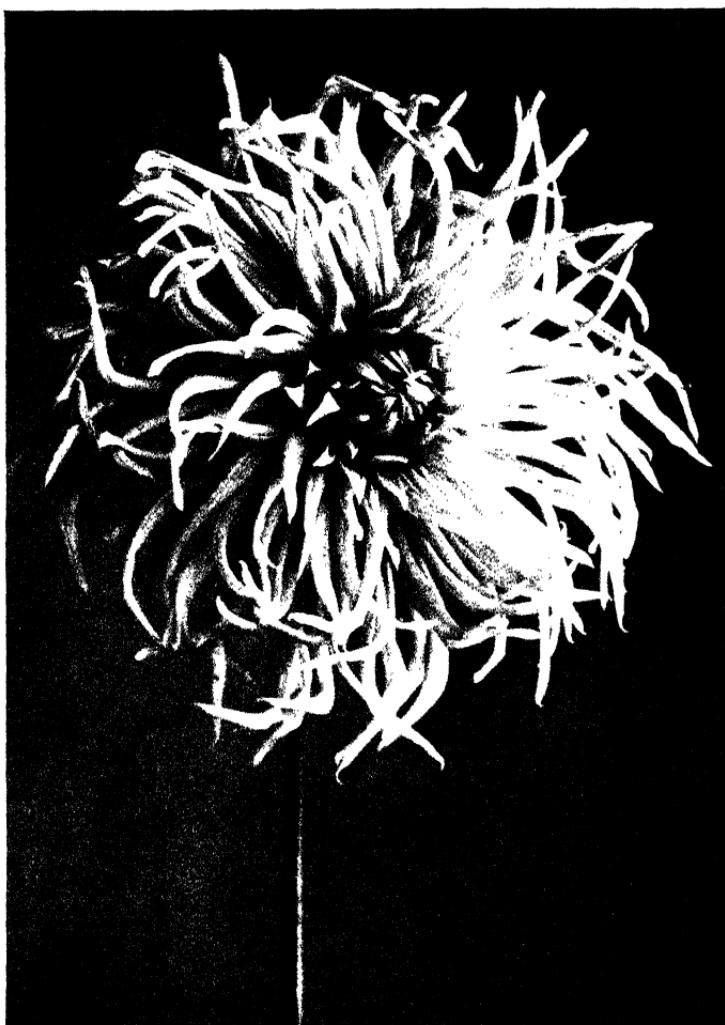


FIG. 25.—CACTUS DAHLIA 'ARCHIBALD V.C.'
Pale amaranth-pink. An example of Class XVA.

[To face p. 60.]

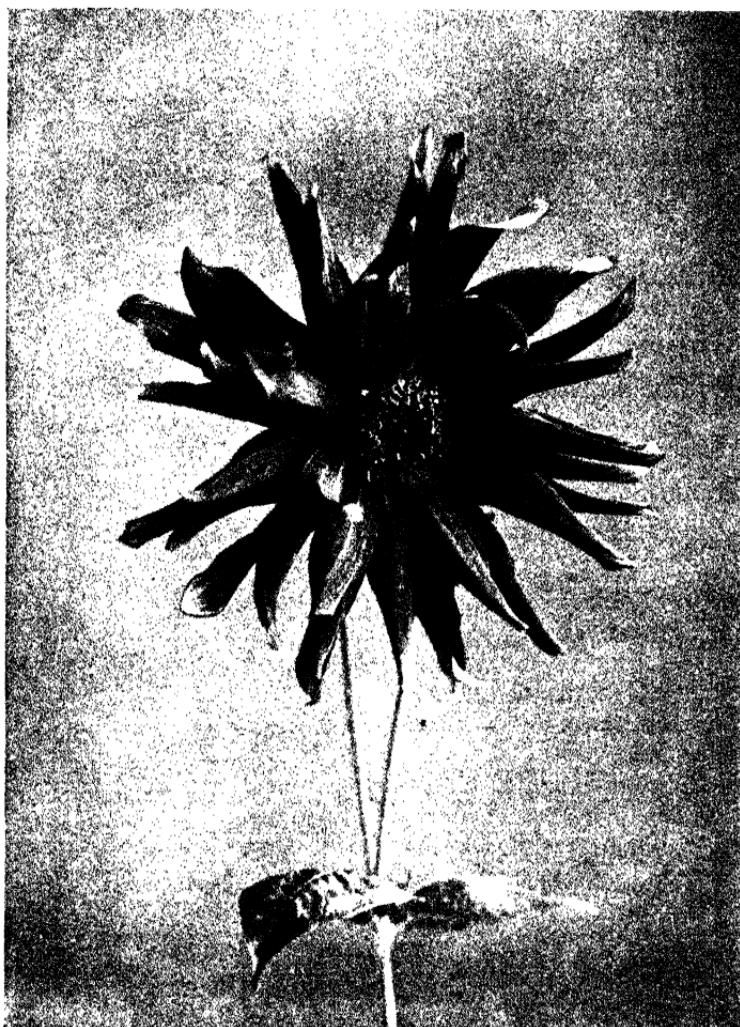


FIG. 26. -SEMI-DOUBLE CACTUS DAHLIA 'EDINA.'
Pale crimson. An example of Class XVb.

- (b). Semi-double, with several rows of spreading florets surrounding a central disc (figure 26).

Edina (Dobbie), A.M. Pale crimson. See vol. 47, p. 72.

- (c). Single, with one more or less regular row only of spreading florets around a central disc.

No awards have been made in this section.

Class XVI. DWARF CACTUS DAHLIAS (figures 25, 26).

The counterpart of Class XV., but not exceeding 3 feet in height.

Argos (Dobbie), A.M. Dark crimson. See vol. 47, p. 73.

DAHLIAS AT WISLEY, 1923.

THE testing of the garden value of new Dahlias was continued at Wisley in 1923. Sixty varieties had been selected for trial by the Joint Committee on Dahlias sitting at Vincent Square, and of these forty-two were grown, the raisers of the others having failed to send them for this final test. These varieties were grown along with varieties that had proved valuable in the two preceding years, and the latter served to set a standard for comparison. Flowering was delayed somewhat owing to the backward season, but at the end of August the plants were in full flower, and continued to blossom well until mid-October, when they were nearly destroyed by frost. They were grown in the same way as last year, and on the same piece of ground, without manure, but well dug and frequently hoed.

Two points of importance in the cultivation of Dahlias are not infrequently overlooked. The first is the removal of all flower buds until the plants are well developed; the second, and even more important, is the removal of all dead flowers as soon as the florets drop. Attention to these, and to staking and tying of growths, make for good growth and flowering over a long season.

The plants grown showed that there is now available a very fine series of Dahlias suitable for garden decoration, and not merely of interest on the show table. Many of them, too, are excellent for table decoration, looking well by artificial light and arranging themselves lightly in vases.

The Awards are made by the Council on the recommendation of a Joint Committee of the R.H.S. Floral Committee and the National Dahlia Society.

In the following notes only varieties tried for the first time or to which higher awards have been given than they received before are included.

AWARDS, DESCRIPTIONS AND NOTES.

Class I. SINGLE DAHLIAS.

AWARDS.

2. **Mamie, A.M.** September 12, 1923. Raised and sent by Messrs. Cheal, Crawley (H.C. 1922).
7. **F. Graham Bird, A.M.** September 12, 1923. Raised and sent by Messrs. Treseder, Cardiff.
5. **Nanno, H.C.** September 12, 1923. Raised and sent by Messrs. Treseder.

Pink to Carmine.

2. **MAMIE (Cheal), A.M.**—See JOURNAL R.H.S. 48, p. 99.

Scarlet.

5. **NANNO (Treseder), H.C.**—5 feet. Flowers of type B; $3\frac{1}{2}$ to $4\frac{1}{2}$ inches; bright orange-scarlet. Very free and well above foliage on 10- to 12-inch stems.

7. F. GRAHAM BIRD (Treseder), A.M.—4½ feet. Flowers of type B; 3½ to 4 inches; scarlet; very freely produced on 9- to 12-inch stalks, carried well above foliage.

Maroon.

8. CRAWLEY BEAUTY (Cheal).—5½ feet. Flowers 4 to 4½ inches; maroon broadly edged crimson; free flowering and carried above foliage on 6- to 9-inch stems. Raised by sender.

Class II. MIGNON SINGLE DAHLIAS.

AWARD.

13. COLTNES GEM, A.M. September 12, 1923. Sent by Mr. Purdie of Glasgow (H.C. 1922).

Scarlet.

13. COLTNES GEM (Purdie), A.M.—See JOURNAL R.H.S. 48, p. 100.

Class III. COLLERETTE DAHLIAS.

Maroon.

21. MONA LISA (Thoday).—6½ feet. Flowers 4 inches; crimson-maroon tipped white, collar white flushed crimson-maroon; fairly free on 8- to 12-inch stalks.

Class V. PÆONY-FLOWERED DAHLIAS.

AWARD.

31. VESUVIUS, A.M. September 12, 1923. Raised and sent by Messrs. Velthuys of Holland (H.C. 1922).

Mauve.

25. LADY GREER (Cheal).—5 feet. Flowers 5 inches diameter; bright satiny light rosolane-purple, base picric-yellow; free, erect on 12- to 14 inch stalks.

27. LADY HALL (Cheal).—6 feet. Flowers 4½ to 5 inches diameter; bright mallow-purple, base picric-yellow; free, erect on 10- to 12 inch stalks.

Terra-cotta.

68. ORANGE BOVEN (van Waveren).—4 feet. Flowers 5 to 6½ inches diameter; terra-cotta shaded orange, fades; free, stalks erect, 6 to 10 inches long.

Scarlet.

31. VESUVIUS (Velthuys), A.M.—See JOURNAL R.H.S. 48, p. 102.

71. RICHARD HENEKEROTH (Carlée).—4½ feet. Flowers 4½ to 5½ inches diameter; bright scarlet; stalks erect, 10 to 12 inches long, free.

Purple.

73. MEVR. G. WURFBAIN (Carlée).—4½ feet. Flowers 5½ to 6½ inches diameter; crimson-purple fading to violet-purple; free on 12-inch stalks.

Class VI. SMALL-FLOWERED PÆONY-FLOWERED DAHLIAS.

AWARDS.

35. PEACH, A.M. September 12, 1923. Raised and sent by Messrs. Burrell, Cambridge.

44. MAC, A.M. September 12, 1923. Raised and sent by Messrs. Burrell.

49. DENYS, A.M. September 12, 1923. Raised and sent by Messrs. Burrell.

53. CRIMSON GLOW, A.M. September 12, 1923. Raised and sent by Messrs. Burrell.

30. WAKE UP, H.C. September 12, 1923. Raised and sent by Messrs. Carlée, Holland.

37. LEONIE COBB, H.C. September 12, 1923. Raised and sent by Messrs. Cheal.

47. LEONIE, H.C. September 12, 1923. Raised and sent by Messrs. Burrell.

White.

34. SOPHIRE (Burrell).—5 feet. Flowers 4 to 4½ inches diameter; white, base picric-yellow; free on 6- to 11-inch stems.

Pink on White.

36. MRS. BARRIS (Cheal).—5 feet. Flowers $3\frac{1}{2}$ inches diameter; white flushed light mallow-purple, base crimson; cup-shaped; free on 8-inch stalks.

37. LEONIE COBB (Cheal), H.C.—4 feet. Flowers 3 to $3\frac{1}{2}$ inches diameter; light mallow-purple tipped white, base picric-yellow; very free on 7- to 12-inch stalks.

Pink on Yellow.

35. PEACH (Burrell), A.M.—5 feet. Flowers 4 to $4\frac{1}{2}$ inches diameter; satiny light mallow-purple on yellow ground, base picric-yellow; very free on 6- to 12-inch stalks.

39. LADY HURST (Cheal).—5 feet. Flowers 3 to $3\frac{1}{2}$ inches diameter; bright satiny mallow-purple on yellow ground, base picric-yellow; free on 6- to 9-inch stalks.

Carmine-rose.

38. WELCOME (Burrell).— $4\frac{1}{2}$ feet. Flowers 4 inches diameter; white suffused rosy-carmine shading to white at tip; free on 5- to 9-inch stalks.

47. LEONIE (Burrell), H.C.— $4\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ to 4 inches diameter; rosy-carmine, shading to mallow-purple at tip; rays flat; very free on 6- to 8-inch stalks.

40. MARCELLA (Burrell).— $4\frac{1}{2}$ feet. Flowers 4 inches diameter; rhodamine-purple, base capucine-yellow; free on 6- to 7-inch stalks.

Mauve.

44. MAC (Burrell), A.M.— $5\frac{1}{2}$ feet. Flowers 4 to $4\frac{1}{2}$ inches diameter; amaranth-pink on orange, shading to satiny orange at base; very free on 8-inch stalks.

45. CHARMER (Burrell).— $4\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ to 4 inches diameter; tyrian-rose, paler towards tip, base chestnut-crimson; free on 10- to 12-inch stalks.

46. BETTY (Burrell).—5 feet. Flowers 4 to $4\frac{1}{2}$ inches diameter; light phlox-purple, base picric-yellow; free on 8- to 10-inch stalks.

Scarlet.

49. DENYS (Burrell), A.M.—5 feet. Flowers 4 inches diameter; scarlet, shading to orange-scarlet at base; very free on 8- to 10-inch stalks.

Crimson.

52. HECTOR (Cheal).—5 feet. Flowers $3\frac{1}{2}$ to $4\frac{1}{2}$ inches diameter; bright rosy-crimson; cup shaped; free on 12-inch stalks.

51. SPICY (Burrell).— $4\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ to 4 inches diameter; crimson-maroon, shaded rosy-crimson towards tip, burns somewhat; free on erect 6- to 9-inch stalks.

53. CRIMSON GLOW (Burrell), A.M.— $4\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ inches diameter; bright crimson-scarlet; very free on erect 8- to 12-inch stalks.

30. WAKE UP (Carlée), H.C.— $4\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ to 4 inches diameter; crimson-scarlet base, white tipped $\frac{1}{4}$ length of floret; free on 5- to 6-inch stalks.

54. WARRIOR (Burrell).— $4\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ to 4 inches diameter; bright crimson on yellow ground, base orange-scarlet, burns somewhat; free on erect 8- to 10-inch stalks.

*Class VIII. DECORATIVE DAHLIAS.**AWARD.*

64. PROTEST, H.C. September 12, 1923. Raised by Mr. J. Glasbergen, Leiden, Holland.

Pink.

59. MR. H. C. DRESSELHUYSEN (Ballego).—6 feet. Flowers 5 to 6 inches diameter; mallow-pink on white ground; just above foliage on erect 9- to 15-inch stalks.

64. PROTEST (Woollven), H.C.—5 feet. Flowers 5 to 6 inches diameter; bright rose-pink, tips paler; free on erect 9-inch stalks.

Mauve.

63. JUBILEE (Kroon).— $3\frac{1}{2}$ feet. Flowers 5 to 6 inches diameter; pale amparo-purple, base picric-yellow; erect on 10- to 12-inch stalks. This variety is intermediate between the Cactus and Decorative types.

Terra-cotta.

67. PRINCE OF WALES (Vianen).—See JOURNAL R.H.S. 48, p. 103.
 69. FLAMBEAU (Wouters).—4½ feet. Flowers 5 to 6 inches diameter; bright terra-cotta on orange ground; free on erect 8-inch stalks.

Crimson.

70. BORDER PERFECTION (Bruidegom).—6½ feet. Flowers 5½ to 6½ inches diameter; bright crimson-scarlet; carried just above foliage on erect 6-inch stalks.

*Class IX. SMALL-FLOWERED DECORATIVE DAHLIAS.**AWARDS.*

83. Juweeltje, A.M. September 12, 1923. Raised and sent by Messrs. Den Older, Leiden, Holland.
 78. RAIDER, A.M. September 12, 1923. Raised and sent by Messrs. Burrell.
 79. Tipsy, A.M. September 12, 1923. Raised and sent by Messrs. Burrell.

Pink.

83. JUWEELTJE (Den Older), A.M.—4½ feet. Flowers 2½ to 3 inches diameter; mallow-pink on white ground; free on erect 7 inch stalks.

Pink on Orange.

74. ZENA (Burrell).—4½ feet. Flowers 4 inches diameter; picric-yellow flushed pale grenadine-pink, base picric-yellow; free on 10-inch stalks.
 78. RAIDER (Burrell), A.M.—4½ feet. Flowers 3½ to 4 inches diameter; grenadine on orange ground, base orange-buff; very free on erect 10 inch stalks.

Scarlet.

79. TIPSY (Burrell), A.M.—4½ feet. Flowers 4 inches diameter; bright scarlet; very free on erect 12 inch stalks.

*Class XI. CAMELLIA-FLOWERED DAHLIAS.**AWARD.*

91. RADIUM, A.M. September 12, 1923. Raised and sent by Mr. P. Thoday.

Rose.

84. MISS TRIST (Cheal).—6 feet. Flowers 3½ to 4 inches diameter; rosy mallow-purple; free on 10 inch stalks.

Orange terra-cotta.

88. NELLY (Carlée).—5 feet. Flowers 3 to 3½ inches diameter; orange shaded terra-cotta; free on 10 inch stalks.

Crimson-scarlet.

91. RADIUM (Thoday), A.M.—4½ feet. Flowers 3 to 3½ inches diameter; crimson-scarlet; very free on erect 10-inch stalks.

*Class XIII. POMPON DAHLIAS.**AWARD.*

97. GLOW, A.M. September 12, 1923. Raised and sent by Messrs. Cheal (C. 1921).

Buff.

97. GLOW (Cheal), A.M.—See JOURNAL R.H.S. 47, p. 69.

*Class XIV. STAR DAHLIAS.**AWARDS.*

106. Gatton Star, A.M. September 12, 1923. Raised and sent by Messrs. Cheal.
 105. Dorking Star, H.C. September 12, 1923. Raised and sent by Messrs. Cheal.
 115. Crimson Star, H.C. September 12, 1923. Raised and sent by Messrs. Cheal.

Pink.

104. SWEET DOROTHY (Turner).—5 feet. Flowers $3\frac{1}{2}$ inches diameter; bright light mallow-purple; very free on erect 8- to 10-inch stalks.

105. DORKING STAR (Cheal), H.C.—5 $\frac{1}{2}$ feet. Flowers 3 to $3\frac{1}{2}$ inches diameter; bright salmon-pink, crimson base; very free on erect 6- to 10-inch stalks.

Pink on Orange.

106. GATTON STAR (Cheal), A.M.—5 feet. Flowers $3\frac{1}{2}$ inches diameter; rosy-salmon on orange ground, tipped mallow-purple; very free on erect 8-inch stalks.

112. MRS. ROWETT (Cheal).—5 feet. Flowers $3\frac{1}{2}$ inches diameter; grenadine-pink on picric-yellow ground, tipped picric-yellow; free on 10- to 12-inch stalks.

Orange-bronze.

114. BRONZE STAR (Cheal).—5 feet. Flowers $3\frac{1}{2}$ inches diameter; grenadine on orange ground, base flushed crimson; free on erect 12-inch stalks.

Crimson-scarlet.

115. CRIMSON STAR (Cheal), H.C.—See JOURNAL R.H.S. 48, p. 105.

*Class XV. CACTUS DAHLIAS.**AWARDS.*

116. JHR. G. VAN TETS, A.M. September 12, 1923. Raised and sent by Messrs. Jan Kriest, Leiden, Holland.

57. SNOWDRIFT, A.M. September 12, 1923. Raised and sent by Messrs. C. Turner, Slough.

White.

116. JHR. G. VAN TETS (Kriest), A.M.—5 feet. Flowers 5 to 7 inches diameter; white; very free on erect 15- to 18-inch stalks.

57. SNOWDRIFT (Turner), A.M.—5 feet. Flowers $3\frac{1}{2}$ to 4 inches diameter; white, base cream; very free on erect 8-inch stalks.

Yellow.

117. MRS. LOWES (Cheal).—5 feet. Flowers $5\frac{1}{2}$ to 6 inches diameter; pale lemon-yellow; carried just above foliage on erect 6-inch stalks.

SALPIGLOSSIS AT WISLEY, 1923.

IN continuation of the attempt to grow annual (or quick-flowering perennial) plants in pots for spring flowering, Salpiglossis were tried in 1923. The main object of the attempt was to secure plants to flower immediately after the bulb-flowering season without the use of artificial heat at any stage. To attempt this with Salpiglossis was a very severe test, and it failed, both in time of flowering and in the fact that a temperature of 36° to 40° F. was required during winter (or at any rate enough heat to exclude frost), and artificial heat had to be used to bring the plants into flower even at the late period (for this test) when they were at their best.

For those who can give the small amount of heat they require Salpiglossis may be recommended, for they well repaid the care and attention they received at the hands of Mr. J. Wilson, and gave a most gorgeous display in May and June. Few flowers are capable of producing such rich and striking colours, none of which, varied as they are, clash with the others, and furthermore, provided the temperature is not too high, the flowers last well. When the principal stem begins to pass out of flower it may be cut down, and the plant will then throw out fresh growths to prolong the flowering time.

The seed was sown on August 31 in sterilized soil, as a precaution against the form of damping off which so frequently causes difficulties with these plants, and on September 18 the seedlings were pricked off into 3-inch pots, also of sterilized soil. They were potted in the third week of October into 4½-inch pots, and into their flowering pots (6½-inch) on December 11. Others were flowered in 4½-inch pots, but the former were the more satisfactory.

The soil used was composed of loam, leaf-soil and sand in about equal parts, with a little lime and broken crocks at the first potting and a little rotted manure in the final potting. The plants were grown in an airy house all the season, and watering was very carefully attended to. This is the most important point in dealing with these plants, one over-watering being sufficient to cause death or at least a very severe check, and it is probable that the fungus attack to which they so frequently fall victims is encouraged by over-watering.

No pains should be spared to give the plants all the light possible, since there is a tendency for them to run up very quickly and to become over-tall.

An exhibit of the plants in flower was arranged at Vincent Square, and created considerable interest in these somewhat neglected but beautiful flowers.

The trial demonstrated that the colours may be bred true, and also that habit and size of flower will breed true. The dwarfer strain,

known as the 'superbissima' strain, was particularly valuable as a pot plant, as it combined the best habit for this purpose with large flowers of all possible shades.

The truest and best stocks in the trial are indicated by the awards shown below.

AWARDS, NOTES, AND DESCRIPTIONS.

A. SUPERBISSIMA TYPE.

Plants dwarfer and more compact; flowers large.

1. *Flowers yellow.*

AWARDS.

2. **superbissima Aurea, A.M.** June 18, 1923. Sent by Messrs. Barr of Covent Garden, W.C.

1. **superbissima Yellow, H.C.** June 18, 1923. Sent by Mr. A. Dawkins of King's Road, Chelsea.

2. **SUPERBISSIMA AUREA** (Barr). **A.M.**—Height 2 feet; flowers $3\frac{1}{2}$ inches diameter, deep golden-yellow with a narrow cream margin.

1. **SUPERBISSIMA YELLOW** (Dawkins). **H.C.**—Characters as for No. 2, but a less regular stock.

2. *Flowers chamois, veined crimson-scarlet.*

AWARDS.

7. **Chamois, A.M.** June 18, 1923. Sent by Messrs. Barr.

8. **superbissima Chamois, H.C.** June 18, 1923. Sent by Mr. A. Dawkins.

7. **CHAMOIS** (Barr), **A.M.**—Height $2\frac{1}{2}$ feet; flowers $3\frac{1}{2}$ – $3\frac{1}{2}$ inches diameter, veined crimson-scarlet on a cream ground, margins paler, throat yellow.

* * *

8. **SUPERBISSIMA CHAMOIS** (Dawkins), **H.C.**—Height $2\frac{1}{2}$ –3 feet; flowers 3 – $3\frac{1}{2}$ inches diameter, veined crimson-scarlet on chamois-yellow ground, paler towards margins. Somewhat variable in shade and height.

3. *Flowers veined scarlet and crimson.*

AWARDS.

14. **Gloxinia-flowered Velvety Red, A.M.** June 18, 1923. Sent by Messrs. W. H. Simpson of Birmingham.

13. **superbissima Dark Scarlet, H.C.** June 18, 1923. Sent by Mr. A. Dawkins.

13. **SUPERBISSIMA DARK SCARLET** (Dawkins), **H.C.**—Height 2–3 feet; flowers 3 – $3\frac{1}{2}$ inches diameter, heavily veined carmine-red on a golden-yellow ground.

12. **DEEP SCARLET** (Barr).—A mixed stock of No. 13.

* * *

28. **MAROON VEINED YELLOW** (Barr).—Height $1\frac{1}{2}$ – $2\frac{1}{2}$ feet; flowers 3 – $3\frac{1}{2}$ inches diameter, margined coppery-chestnut, throat golden-yellow. Stock variable.

* * *

14. **GLOXINIA-FLOWERED VELVETY RED** (W. H. Simpson), **A.M.**—Height $2\frac{1}{2}$ feet; flowers $3\frac{1}{2}$ inches diameter, deep velvety crimson-carmine, margins paler.

15. **BRILLIANT CRIMSON** (Barr).—A variable stock of No. 14.

4. *Flowers blue and yellow.*

AWARDS.

19. **Lilac veined Yellow, H.C.** June 18, 1923. Sent by Messrs. Barr.

24. **Purple-violet and Yellow, H.C.** June 18, 1923. Sent by Messrs. Barr.

19. **LILAC VEINED YELLOW** (Barr), **H.C.**—Height 2 feet; flowers 3 – $3\frac{1}{2}$ inches diameter, narrow margin of pale lilac, throat deep golden, fades very much.

10. ROSE (Barr).—Height 2½ feet; flowers 3 inches diameter, margins rosy-lilac veined crimson, centre golden-yellow with narrow crimson veins. Stock not true.

* * *

24. PURPLE-VIOLET AND YELLOW (Barr), H.C.—Height 1½-2½ feet; flowers 3-3½ inches diameter, pale purplish-violet veined golden-yellow towards throat.

5. *Flowers crimson-maroon.*

AWARD.

27. BLACK, H.C. June 18, 1923. Sent by Messrs. Barr.

27. BLACK (Barr), H.C.—Height 1½-2 feet; flowers 3-3½ inches diameter, deep crimson-maroon.

6. *Flowers of mixed shades.*

AWARD.

29. DWARF LARGE-FLOWERED MIXED, A.M. June 18, 1923. Sent by Messrs. W. H. Simpson.

29. DWARF LARGE-FLOWERED (W. H. Simpson), A.M.—A good mixed strain.

B. VARIARILIS TYPE.

Plants usually taller and more diffuse; flowers sometimes smaller.

1. *Flowers yellow.*

AWARDS.

5. YELLOW EDGED WHITE, A.M. June 18, 1923. Sent by Messrs. W. H. Simpson.

3. YELLOW, A.M. June 18, 1923. Sent by Mr. Dawkins.

5. YELLOW EDGED WHITE (W. H. Simpson), A.M.—Height 3-3½ feet; flowers 3 inches diameter, golden-yellow with a broad cream margin.

* * *

3. YELLOW (Dawkins), A.M.—Height 3½ feet; flowers 3 inches diameter, very deep golden-yellow.

4. GOLDEN YELLOW (Toogood).—An untrue stock of No. 3.

2. *Flowers scarlet and crimson.*

AWARD.

9. CHAMOIS-ROSE CARMINE CENTRE, A.M. June 18, 1923. Sent by Messrs. W. H. Simpson.

9. CHAMOIS-ROSE CARMINE CENTRE (W. H. Simpson), A.M.—Height 3 feet; flowers 3½ inches diameter, light reddish-lilac, margins paler, veined crimson and yellow.

* * *

11. CARMINE-RED STRIPED YELLOW (W. H. Simpson).—Height 2½-3 feet; flowers 3 inches diameter, margins carmine-red, centre golden yellow, with narrow carmine-red veins.

* * *

17. CRIMSON (Toogood).—Height 3½ feet; flowers 3-3½ inches diameter, crimson-carmine, veined deep golden-yellow towards throat. A variable stock.

* * *

6. YELLOW STRIPED (Dawkins).—Height 3½-4 feet; flowers 3-3½ inches diameter, deep chestnut-crimson, veined yellow on upper lobes. A variable stock.

* * *

16. CRIMSON (Dawkins).—Height 3 feet; flowers 3 inches diameter, deep chestnut-crimson. Varies very much in shade.

3. *Flowers blue and yellow.*

AWARDS.

{ 25. Purple and Gold, A.M. June 18, 1923. Sent by Messrs. Toogood of Southampton.

18. superbissima Light Blue, A.M. June 18, 1923. Raised by Messrs. Heinemann of Erfurt, Germany, and sent by Mr. Dawkins.

22. **Violet d'Iris, A.M.** June 18, 1923. Sent by Messrs. W. H. Simpson.
 26. **Purple, H.C.** June 18, 1923. Sent by Mr. Dawkins.

25. **PURPLE AND GOLD** (Toogood). **A.M.**—Height 2½-3 feet; flowers 3 inches diameter, pale bluish-violet veined deep golden-yellow.

18. **SUPERBISSIMA LIGHT BLUE** (Dawkins), **A.M.**—Too much like the last and not a true 'Superbissima' type.

20. **LIGHT BLUE AND YELLOW** (Barr).—A mixed stock of No. 25.

21. **BLUE AND GOLD** (Dawkins).—A mixed stock of No. 25.

* * *

22. **VIOLET D'IRIS** (W. H. Simpson), **A.M.**—Height 2½-3 feet; flowers 3½-3½ inches diameter, deep violet-purple, margins paler.

23. **PURPLE VIOLET** (Barr).—A variable stock of No. 22.

* * *

26. **PURPLE** (Dawkins), **H.C.**—Height 3½-3¾ feet; flowers 3½-3½ inches diameter, deep purplish-crimson, margins bluish-violet. Stock not quite true.

4. *Flowers of mixed shades.*

31. **DWARF COMPACT STRAIN** (Barr).—Height 2¼-2½ feet; flowers 2½ inches diameter. A dwarf strain of the old type with small flowers.

* * *

30. **VARIABILIS, SUPERBISSIMA MIXED** (W. H. Simpson).—A mixed strain of 'Variabilis' and 'Superbissima' types.

32. **LARGE-FLOWERED CHOICE MIXED** (Barr).—Similar to No. 30.

33. **SUPERBISSIMA CHOICE MIXED** (Barr).—Mixed with 'Variabilis' type.

SWEET PEAS AT WISLEY, 1923.

THE trial of Sweet Peas begun in 1921 and carried on through 1922 was continued in 1923. The method of cultivation was precisely the same as described in the reports of the two preceding years and need not be further detailed. The success attending the method was again apparent this season.

In 1923 the sections falling to be tried were Picotee, bicolour, flaked and marbled pinks, salmon, deep pink, cerise, orange-pink, orange, orange-scarlet, and scarlet. It is, of course, difficult to draw the line between the pink varieties of 1922 and some that might be included in the categories just mentioned, but as a whole the 157 stocks represented in the trials formed distinct groups from those of the previous year. One of the stocks sent in was the dwarf 'Cupid Sweet Pea, Little Nell'; Nos. 14, 21, 22, 33, 63 were unnamed seedlings not selected for awards; and Nos. 20 and 96 were very mixed stocks. None of these are further referred to.

Among the 157 stocks, 106 different names were represented, but in some cases, as will be seen below, there were two names for the same thing.

A distinct drawback to the outdoor garden cultivation of several of the orange and orange-scarlet varieties is the speed with which the weather affects the colour. Excellent when grown under glass (and as seen in exhibitions), some of the most striking in these circumstances are scarcely worth a place in the open garden. The characteristics of the varieties in this direction are noted below.

The plants were inspected on two or three occasions by the Society's Committees while growing, and awards were finally recommended on July 27, as noted below.

Several "early-flowering" varieties came from America, the characteristics and drawbacks of which are noted in our last report.

AWARDS, DESCRIPTIONS, AND NOTES.

I. PINK PICOTEES ON WHITE GROUND.

AWARDS.

{ 4. **Annie Ireland, A.M.** July 27, 1923. Raised by Messrs. Dobbie and sent by Messrs. A. Dickson, Newtonards. (A.M. 1919, Ireland & Hitchcock.)
 3. **Elsie, A.M.** July 27, 1923. Raised and sent by Messrs. Dobbie, Edinburgh.

1. **EARLY DAINTINESS** (Burpee).—Edged pale rose-pink; flowers large, in threes on 5- or 7-inch stems; somewhat variable in shade. Early-flowering type.

* * *

2. **DAISY K. ELLIOTT** (Elliott).—Characters as for No. 1, but of ordinary type. Raised by sender.

* * *

4. **ANNIE IRELAND** (A. Dickson), A.M. }—Edged pale rose-pink; flowers large, in
 3. **ELsie** (Dobbie), A.M. } fours on 8-inch stalks; plants vigorous.

II. PINK PICOTEES ON CREAM GROUND.

AWARD.

13. Ryburgh Lemon Picotee, A.M. July 27, 1923. Raised and sent by Mr. A. Stark of Ryburgh.

5, 6. JEAN IRELAND (Pearson, Dobbie).—Creamy-buff, edged pale carmine-rose; flowers large, mostly in threes on 7-inch stalks. Raised by Messrs. Dobbie.

7, 8. CHERUB (A. Dickson, Cullen).—Too much like the last, but of a somewhat warmer tone. Raised by Messrs. A. Dickson.

* * *

55. LEMON BEAUTY (Burpee).—Very similar to Nos. 5, 6, but early flowering.

* * *

11. DUPLEX HELEN WILLIAMS (Stark).—Edged and flushed carmine-rose; flowers large, mostly single, and generally in threes on 10-inch stalks. Raised by sender, but needs further selection.

18. SEEDLING No. 19 (Bartlett).—Too much like the last.

* * *

9. SUNBEAM (Watkins & Simpson).—A mixed stock, mainly edged and flushed carmine-rose.

* * *

13. RYBURGH LEMON PICOTEE (Stark), A.M.—Cream, edged and flushed carmine-rose, wings paler; flowers large, mostly in threes on 10-inch stalks; plants vigorous.

* * *

10. MINNA BURNABY (Stark).—Near 'Ryburgh Lemon Picotee,' but flowers smaller; a weak stock.

* * *

12. EARLY EXQUISITE (Burpee).—A mixed stock, mainly cream, edged and flushed pale eosine-pink.

III. FLAKED PINK ON WHITE GROUND.

AWARD.

15, 16. Phyllis, H.C. July 27, 1923. Raised by Mr. W. J. Unwin and sent by Messrs. A. Dickson and Cullen of Witham.

15, 16. PHYLЛИS (A. Dickson, Cullen), H.C.—White, striped and flaked rose-dorée, margins white; flowers large, apt to burn badly, in threes on 8-inch stalks. Plants vigorous.

* * *

19. AURORA (Burpee).—White, marbled in centre carmine; flowers large, in threes on 9-inch stalks; plants of medium vigour; early flowering type.

IV. MARBLED CARMINE ON CREAM GROUND.

17. MAY CAMPBELL (Dobbie).—Cream, marbled in centre reddish-carmine; flowers large, mostly in threes on 8-inch stalks. Very variable in shade. Raised by sender.

V. DEEP PINK ON WHITE GROUND.

AWARD.

41. Mrs. H. Richards, A.M. July 27, 1923. Raised and sent by Mr. W. J. Unwin of Histon.

41. MRS. H. RICHARDS (Unwin), A.M.—White, suffused salmon-pink; flowers large, in threes on 9-inch stalks; burns somewhat. A very good stock.

* * *

38, 39. CAPT. CHAS. BURGESS (Unwin).—Very much like 'Mrs. H. Richards,' but somewhat paler in tone; burns somewhat. No. 38 not true, contained rogues. Raised by sender.

* * *

37. FAIRY QUEEN (Burpee).—Carmine-rose on white ground; flowers large, in threes on stiff 7-inch stalks; early flowering.

30. ROSEMARY (E. W. King).—Bright carmine-rose on white ground ; flowers large, mostly in threes on 11-inch stalks ; plants vigorous. Raised by sender.

* * *

49. KENNETH (Dobbie).—Bright carmine-rose on white ground with white zone at base of standard ; flowers large, in threes, many fours, on 10-inch stalks. Raised by Messrs. Morse.

VI. DEEP PINK ON CREAM GROUND.

AWARDS.

40. NEW MIRIAM BEAVER, A.M. July 27, 1923. Raised by Messrs. Burpee and sent by Messrs. R. Veitch of Exeter.

56. WILD ROSE, A.M. July 27, 1923. Raised and sent by Mr. J. Stevenson of West Moors.

50. JOHN INGMAN, A.M. July 27, 1923. Raised by Mr. Silas Cole and sent by Messrs. Barr of Covent Garden.

24. MARY ROSE, H.C. July 27, 1923. Raised by Mr. A. Malcolm and sent by Messrs. Dobbie.

40. NEW MIRIAM BEAVER (R. Veitch), A.M.—Pale eosine-pink on cream ground ; flowers large, in threes on 10-inch stalks. Plants very vigorous.

* * *

56. WILD ROSE (Stevenson), A.M.—Salmon-rose on cream ground ; flowers large, in threes, many fours, on 11-inch stalks ; burns somewhat. Plants vigorous.

* * *

142. HONOR BRIGHT (Burpee).—Mallow-purple on cream ; flowers large, in threes on 11- or 12-inch stalks. Raised by sender. Distinct from No. 143 sent under this name (see Section IX. below).

* * *

24. MARY ROSE (Dobbie), H.C.—Pale soft rose on cream ; flowers large, mostly in threes on 9-inch stalks ; fades and burns somewhat. Plants of medium vigour.

* * *

25. ROSALIND (Burpee).—Bright rosy-carmine on cream ; flowers large, in threes on 8-inch stalks. Plants vigorous. Raised by sender.

43. FORDHOOKE ROSE IMPROVED (Burpee).—Too much like 'Rosalind.'

* * *

50. JOHN INGMAN (Barr), A.M.—Bright carmine-rose standards, wings of a brighter shade ; flowers mostly in threes, many fours, on 10-inch stalks. Plants very vigorous.

51. GEORGE HERBERT (A. Dickson).—Too much like No. 50. Mixed with grandiflora type.

52-54. MASCOTTS INGMAN (Ireland & Hitchcock, Toogood).—Too much like No. 50. No. 52 contained pink rogues, No. 53 mauve rogues, and No. 54 was mixed with grandiflora type.

* * *

44-47. RENOWN (Dobbie, A. Dickson, Unwin, Toogood).—Bright carmine-rose on cream ground ; flowers large, in fours on 10-inch stalks. Plants vigorous. Nos. 45-47 contained rogues. Raised by Mr. A. Malcolm.

VII. PINK BICOLOURS.

AWARD.

32. BUTTERFLY SPENCER, A.M. July 27, 1923. Raised and sent by Mr. A. Stark.

27. ROSY RAPTURE (Stevenson).—Standards pale salmon-pink on white ground, margins darker, wings paler ; flowers large, in fours on 7 inch stalks. Plants of medium vigour. Stock not quite true. Raised by sender.

* * *

29. MRS. CUTHBERTSON (Dobbie).—Standards clear rose-pink, wings white, flushed pale rose-pink ; flowers large, in fours on 8 inch stalks. Plants vigorous. Raised by sender.

34. QUEEN OF HEARTS (Winn).—Too much like No. 29. Raised by sender.

32. BUTTERFLY SPENCER (Stark), A.M.—Much like No. 29, but [standards of a somewhat darker shade.

31. FAVOURITE (Burpee).—Too much like No. 29, but flowers in threes and standards of a somewhat paler shade.

* * *

48. MRS. J. T. WAKEFIELD IMPROVED (Unwin).—Standards edged and suffused rose-pink, wings of a paler shade; flowers large, in fours on 10-inch stalks. Raised by sender. Stock not quite true.

* * *

28. DORA (Dobbie).—Standards deep rose-pink, wings cream flushed pale rose-pink; shade variable; flowers large, in threes on 8-inch stalks. Plants very vigorous. Raised by sender.

* * *

35, 36. SPARKLER (A. Dickson, Cullen).—Standards deep rose, wings cream flushed rose-pink; flowers large, in fours on 10-inch stalks. Plants very vigorous. No. 36 contained rogues. Raised by Messrs. Burpee.

VIII. ORANGE PINK.

AWARDS.

89. ILLUMINATION, A.M. July 27, 1923. Introduced and sent by Messrs. Burpee of Philadelphia.

65. BUNTY, A.M. July 27, 1923. Raised and sent by Messrs. Ireland & Hitchcock of Marks Tey.

57. GEORGE SHAWYER, A.M. July 27, 1923. Raised by Mr. A. Malcolm and sent by Messrs. Dobbie. (A.M. Dobbie, 1920.)

124. DONALD MCNAUGHTON, A.M. July 27, 1923. Raised and sent by Mr. C. Elliott of Illinois.

95. GLITTERS (Burpee), H.C.—Bright salmon suffused orange; flowers large, in threes on 9-inch stalks. Plants very vigorous. Burns somewhat.

* * *

89. ILLUMINATION (Burpee), A.M.—Characters as for No. 95, but of a brighter and darker shade.

* * *

23. CHEERFUL (Burpee)—Bright rosy-salmon-orange; flowers large, in threes on 7-inch stalks. Plants of medium vigour. Early-flowering type.

* * *

80, 81. JOHN PORTER (A. Dickson, Cullen), H.C.—Standards rich salmon-orange, wings as standards, but tinted rose; flowers large, mostly in fours on 12-inch stalks; burns somewhat. Plants very vigorous.

82, 83. EDROM BEAUTY (Dobbie, Barr).—Too much like Nos. 80, 81. Raised by Mr. Malcolm.

84. ANGLIAN ORANGE IMPROVED (E. W. King).—Too much like Nos. 80, 81. Raised by sender.

85. HELEN LEWIS (Barr).—A somewhat deeper shade than Nos. 80, 81, but too much alike. Raised by Mr. Watson.

87. ORANGE PRINCE SPENCER (R. Veitch).—Too much like Nos. 80, 81.

88. ORIOLE (Elliott).—Too much like Nos. 80, 81. Raised by sender.

* * *

65. BUNTY (Ireland & Hitchcock), A.M.—Very similar to Nos. 80, 81, but more orange, otherwise indistinguishable.

66-68. BUNTY (Cullen, Toogood, R. Veitch).—Less good stocks of No. 65.

76. FLAMINGO (Burpee).—Too much like 'Bunty.'

79. GLORIA (Watkins & Simpson).—Of a somewhat redder shade than 'Bunty,' but contained rogues of that variety.

57. GEORGE SHAWYER (Dobbie), A.M.—Standards orange-salmon, wings as standards, but tinted rose; flowers large, in threes, few fours, on 11-inch stalks; burns. Plants very vigorous. Very much like 'Bunty.'

58, 59. GEORGE SHAWYER (E. W. King, Unwin).—Less good stocks of No. 57.

26. PATHFINDER (Stark).—Too much like No. 57. Raised by sender.

* * *

42. GORGEOUS (Burpee).—Bright salmon-rose, tinted orange; flowers large, in threes on 8-inch stalks; burns. Introduced by sender.

* * *

124. DONALD MCNAUGHTON (Elliott), A.M.—Deep salmon-orange; flowers large, in threes on 9-inch stalks; burns somewhat. Plants vigorous.

IX. SALMON.

AWARD.

60. **Liberty, A.M.** July 27, 1923. Raised and sent by Mr. J. Stevenson.

69-72. **BARBARA** (A. Dickson, E. W. King, Barr, Toogood).—Salmon-orange; flowers large, in threes on 9-inch stalks; burns very much. Nos. 70-72 not true. Raised by Mr. R. Holmes.

73. **BARBARA IMPROVED** (Ireland & Hitchcock).—Similar to Nos. 69-72.

74, 75. **MELBA** (Dobbie, Barr).—Too much like Nos. 69-72. No. 75 not true. Raised by Mr. Malcolm.

91. **EARL SPENCER** (Barr).—Too much like Nos. 69-72. Raised by Mr. S. Cole.

90. **MRS. KERR** (Burpee).—Too much like Nos. 69-72. Stock not quite true.

86. **INSPECTOR** (Dobbie).—Too much like Nos. 69-72. Raised by Mr. A. Malcolm.

* * *

60. **LIBERTY** (J. Stevenson), **A.M.**—Bright salmon-orange; flowers large, mostly single, few double, in threes, few fours, on 10-inch stalks; burns. Plants vigorous.

61. **LIBERTY** (A. Dickson).—Similar to No. 60. Stock not true.

64. **SUNSET** (J. Stevenson).—Too much like 'Liberty.' Raised by sender.

X. ORANGE.

AWARD.

103, 105-107. **TANGERINE IMPROVED, H.C.** July 27, 1923. Raised by Mr. Bolton and sent by Messrs. A. Dickson, R. Veitch, Ireland & Hitchcock, Dobbie.

92-94. **ROBERT SYDENHAM** (Barr, Cullen, A. Dickson).—Bright orange; flowers large, in threes, many twos, on 9-inch stalks; burns. Plants vigorous. Raised by Messrs. E. W. King.

98. **GOLDEN GLORY** (J. Stevenson).—Too much like Nos. 92-94. Raised by sender.

99. **ORANGE** (Dobbie).—Too much like Nos. 92-94. Raised by sender.

100. **ORANGE** (Burpee).—Too much like Nos. 92-94. Raised by sender.

77, 78. **FORDHOOK ORANGE** (Burpee).—Too much like Nos. 92-94. No. 77 not true. Raised by sender.

* * *

103, 105-107. **TANGERINE IMPROVED** (A. Dickson, R. Veitch, Ireland & Hitchcock, Dobbie), **H.C.**—Glowing orange; flowers large, in threes on 10-inch stalks; burns. Plants vigorous.

102, 104. **TANGERINE IMPROVED** (Barr, Toogood).—Similar to Nos. 103, 105-107, but stocks not true.

101. **TANGERINE** (Nutting).—A less good stock than Nos. 103, 105-107.

XI. ORANGE-SCARLET.

AWARDS.

62. **Pimpernel, A.M.** July 27, 1923. Raised and sent by Messrs. E. W. King of Coggleshall. Not in commerce.

110-112. **Gloriosa, A.M.** July 27, 1923. Raised by Mr. Bolton and sent by Messrs. Toogood of Southampton, R. Veitch, Dobbie.

108. **Thomas Stevenson Improved, A.M.** July 27, 1923. Sent by Messrs. Morse of San Francisco.

115. **May Unwin, A.M.** July 27, 1923. Raised and sent by Mr. W. J. Unwin.

62. **PIMPERNEL** (E. W. King), **A.M.**—Bright, clean orange-scarlet; flowers large, in threes on 10-inch stalks. Plants of medium vigour.

* * *

97. **POPPI** (J. Stevenson).—Very similar to No. 62, but with a trace of blue in the flowers. Raised by sender.

* * *

110-112. **GLORIOSA** (Toogood, R. Veitch, Dobbie), **A.M.**—Bright, rich orange-scarlet; flowers large, in threes on 11-inch stalks. Plants very vigorous.

119. SENSATION (Dobbie).—Too much like Nos. 110-112. Raised by Messrs. E. W. King.

116-118. PRESIDENT (Dobbie, J. K. King, R. Veitch).—Too much like Nos. 110-112. No. 118 a mixed stock. Raised by Messrs. A. Dickson.

121. EDWARD COWDY (R. Veitch).—Too much like 'Gloriosa.' Stock not quite true.

109. MAY COWDY (Unwin).—Too much like 'Gloriosa.' Stock not quite true. Raised by sender.

* * *

108. THOMAS STEVENSON IMPROVED (Morse), A.M.—Bright orange-scarlet, wings tinted rose; flowers large, mostly in threes, few fours, on 10-inch stalks. Plants vigorous.

113, 114. THOMAS STEVENSON (Dobbie, Barr).—Less good stocks of No. 108.

115. MAY UNWIN (Unwin), A.M.—A somewhat softer shade of No. 108, but otherwise like it.

* * *

120. SUNPROOF ORANGE-SCARLET (Waller Seed Co.).—Bright orange-scarlet, tinted rose; flowers large, in threes, many fours, on 11-inch stalks. Plants vigorous.

XII. CERISE.

AWARDS.

123. CHARMING, A.M. July 27, 1923. Raised and sent by Mr. J. Stevenson.

144, 146. ROYAL SALUTE, H.C. July 27, 1923. Raised and sent by Messrs.

E. W. King, also sent by Messrs. J. K. King.

126, 127. MASCOTTS CERISE (Ireland & Hitchcock).—Standards pale cerise, wings cerise; flowers large, in threes on 9-inch stalks. No. 126 a weak stock. Stocks not quite true. Raised by sender.

* * *

129. FIRE KING (Burpee).—Cerise tinged with mauve; flowers large, in threes on 7-inch stalks; burns somewhat.

* * *

123. CHARMING (Stevenson), A.M.—Deep cerise on cream ground; flowers large, in threes, few fours, on 10- or 11-inch stalks. Plants vigorous. Burns somewhat. Not in commerce.

* * *

144, 146. ROYAL SALUTE (E. W. King, J. K. King), H.C.—Deep cerise; flowers large, in fours on 12-inch stalks. Plants vigorous. Burns somewhat.

145. ROYAL SALUTE (R. Veitch).—A mixed and poor stock of No. 144.

143. HONOR BRIGHT (R. Veitch).—Similar to No. 144.

140. FIERY CROSS (R. Veitch).—Too much like No. 144. Plants of medium vigour. Burns somewhat.

130. SCARLET ADVANCE (Elliott).—Too much like No. 144. Mixed with grandiflora type.

125. MARION POISELL (Elliott).—Too much like No. 144. A mixed stock. Raised by sender.

141. BRILLIANT (J. Stevenson).—Much like No. 144. Raised by sender. Plants vigorous.

XIII. DEEP CHERRY-CERISE.

122. CIRCE (J. Stevenson).—Similar to 'Royal Cherry,' but with cream ground. (See JOURNAL, 48, p. 111.)

128. CHERRY PIE (E. W. King).—Too much like No. 122. Raised by Mr. S. F. Curtis.

XIV. CERISE TONED ORANGE-SCARLET.

147, 148. ALEX. MALCOLM (Dobbie, Barr).—Cerise toned orange-scarlet; flowers large, in threes on 11-inch stalks; burns somewhat. Plants of medium vigour. Raised by Mr. A. Malcolm.

149-156. ROYAL SCOT (Dobbie, A. Dickson, Unwin, Toogood, R. Veitch, Barr, J. K. King, E. W. King).—Too much like 'Alex. Malcolm.' No. 155 a poor stock; No. 156 not quite true. Raised by Mr. A. Malcolm.

XV. CERISE-SCARLET.

131, 132. SCARLET EMPEROR (Barr, R. Veitch).—Bright cerise-scarlet; flowers large, in threes on 10-inch stalks; burns somewhat. Plants of medium vigour. Raised by Mr. R. Holmes.

* * *

133. SCARLET DUPLEX (R. Veitch).—Rich cerise-scarlet; flowers single, characters otherwise similar to 'Scarlet Emperor.' Mixed with grandiflora type.

XVI. SCARLET.

AWARDS.

134-136. Mascots Scarlet,

137. Hawlmak Scarlet,

138. Mrs. C. P. Tomlin,

139. The Cardinal,

A.M. July 27, 1923.

Raised by Messrs. Ireland & Hitchcock and sent by Messrs. R. Veitch, Barr, Holmes of Tain. (A.M. Ireland & Hitchcock, 1916.)
 Raised by Messrs. A. Dickson and sent by Messrs. Cullen.
 Raised by Mr. F. C. Woodcock and sent by Messrs. Nutting of Southwark.
 Sent by Messrs. R. Veitch.

134-136. MASCOTTS SCARLET (R. Veitch, Barr, Holmes), A.M.—Rich scarlet; flowers large, in threes, many fours, on 12-inch stalks; burns somewhat. Plants vigorous.

137. HAWLMARK SCARLET (Cullen), A.M.—Similar to 'Mascotts Scarlet.'

138. MRS. C. P. TOMLIN (Nutting), A.M.—Similar to 'Mascotts Scarlet.'

139. THE CARDINAL (R. Veitch), A.M.—Similar to 'Mascotts Scarlet.'

WINTER-FLOWERING CARNATIONS AT WISLEY, 1921-3.

GROWERS were invited to send varieties of perpetual-flowering Carnations to Wisley in the early part of 1921 in order that their merits as winter-flowering plants might be compared and their value for this purpose judged. A large number of varieties were sent in, but unfortunately the plants were not all at the same stage of growth when received, and a considerable number were suffering from the attacks of rust (*Uromyces caryophyllinus*) and had to be quarantined. The majority of the latter recovered on being grown in a house with a dry atmosphere; for where it is possible to control the amount of moisture in the air it is not likely that a good cultivator will find his Carnations fall to the attacks of either rust, which is encouraged by a damp atmosphere, or red spider, which flourishes when conditions are too dry.

The plants were brought into their winter quarters in 6-inch pots and began to flower in October 1921, and flowered in these pots until April 1922. It was then determined to try an experiment in cultivation as well as further to test their winter-flowering capabilities through another season.

In mid-April 1922 the plants were removed to frames, the growths were cut back to within one to three inches of their origin, and in mid-May potted on into 10-inch pots. They "broke" well and were grown on and brought into the house again in July 1922, and flowered there until October 1923.

Judging was carried out by a special Committee, who examined the plants at intervals during each of the two winters and on each occasion allocated marks, the final awards being made at the end of March 1923, and being based upon the behaviour of the plants during the two winter periods. In forming their judgment the Committee took into consideration the vigour and hardiness of the variety, its habit, the colour and form of its flowers, and the number of well-formed flowers produced during the months October to April.

Judged for their flowering in summer, many more varieties might have attained awards, but as the trial was entirely for winter-flowering the behaviour of the plants in winter was alone considered. Reluctance to flower in winter is a drawback to some varieties; in others, especially the scarlet varieties, the colour is less clean than in summer; and in many the calyx splits in winter but is far less prone to do so in summer. The last defect is sometimes guarded against by tying or banding the calyx before the flower opens, but this extraneous aid to perfection was not used in these trials, and varieties prone to split the calyx were not favourably judged.

The figures given in the descriptions show the number of flowers produced during the two winters, thus, "(22 a plant)"; and at the end

of each description the number in brackets, e.g. "(55)," shows the total number produced during the two winters and the one summer of flowering. These figures are averages usually of three, but sometimes of six, plants of the variety.

The following varieties, which had received awards in previous years, were represented in the trial, and these were passed over by the Judging Committee on this occasion, as being less valuable for *winter* flowering than those recommended for awards :

14. Mrs. G. Lloyd Wigg [A.M. (Wells) 1915]; 18. Snowstorm [A.M. (Lawrenson) 1912]; 24. Saffron [A.M. (Engelmann) 1919]; 32. Alice [A.M. (Stuart Low) 1915]; 39. Baroness de Brien [A.M. (Stuart Low) 1911]; 42. R. F. Felton [A.M. (Burnett) 1910]; 46. Lady Meyer [A.M. (Guile) 1912]; 51. Renown [A.M. (Cutbush) 1920]; 61. Philadelphia [A.M. (Wells) 1913]; 68. Rose Sensation [A.M. (Wells) 1916]; 69. Mrs. C. W. Ward [A.M. (Lange) 1910]; 70. Good Cheer [A.M. (Wells) 1915]; 72. Rose-Pink Enchantress [A.M. (Dutton, Lange) 1907]; 85. Madelaine [A.M. (Turner) 1891]; 89. Mrs. A. F. Dutton [A.M. (Dutton) 1912]; 95. Regina [A.M. (Engelmann) 1910]; 96. Bedford Belle [A.M. (Laxton) 1914]; 97, 98. Salmon Enchantress [A.M. (Allwood) 1912]; 100. Mrs. H. Burnett [A.M. (Burnett) 1906]; 103. Lady Ingestre [A.M. (Cutbush) 1913]; 111. Dr. V. G. Ward [A.M. (Stoop) 1918]; 122. Mrs. C. F. Raphael [A.M. (Burnett) 1910]; 127. Champion [A.M. (Wells) 1913]; 136. Scarlet Carola [A.M. (Engelmann) 1914]; 139, 140. Beacon [A.M. (Dutton, Lange, Paul) 1907]; 142. Thor [A.M. (Engelmann) 1921]; 143. Rose Dorée [A.M. (Lancashire) 1909]; 146. Britannia [A.M. (Smith) 1906]; 150. Scarlet Glow [A.M. (Lange, Stuart Low) 1910]; 152. Edward Allwood [A.M. (Allwood) 1920]; 156. St. Nicholas [A.M. (Stuart Low) 1912]; 165, 166. Mrs. Edward Douty [A.M. (Stuart Low) 1917]; 176. Fairmount [A.M. (Allwood) 1913]; 198. Chelsea [A.M. (Dutton) 1914]; 204. Calypso [A.M. (Smith) 1898]; 208. Marmion [A.M. (Burnett) 1907]; 241. Cinderella [A.M. (Fairbairn) 1913].

AWARDS, NOTES, AND DESCRIPTIONS.

A. PERPETUAL FLOWERING TYPES.

I. Flowers white.

AWARDS.

3, 4. **White Wonder, A.M.** March 29, 1923. Raised by Messrs. F. Dorner, and sent by Messrs. Allwood of Hayward's Heath and Messrs. Engelmann of Saffron Walden. [A.M. (Allwood) 1911.]

1, 2. **Wivelsfield White, A.M.** March 29, 1923. Raised and sent by Messrs. Allwood; also sent by Messrs. Engelmann. [A.M. (Allwood, Engelmann) 1922.]

16. **Iceberg, A.M.** March 29, 1923. Raised and sent by Mr. F. A. Jones of Trowbridge.

5, 6. **White Enchantress, H.C.** March 29, 1923. Raised by Mr. Marquise, and sent by Messrs. Allwood and Engelmann.

10. **White Pearl, H.C.** March 29, 1923. Raised and sent by Messrs. Stuart Low of Bush Hill Park. [A.M. (Stuart Low) 1922.]

12. **Whiteall, C.** March 29, 1923. Raised and sent by Mr. F. A. Jones.

17. **White Benora, C.** March 29, 1923. Introduced and sent by Messrs. Allwood.

5, 6. **WHITE ENCHANTRESS** (Engelmann, Allwood), **H.C.**—2½ feet; vigorous and quick-growing; flowers (17 a plant) 3½ inches diameter, pure white, of good form, petals broad, fringed; flowering consistently. Sport from 'Enchantress' (35).

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3. **WHITE WONDER SELECTED** (Allwood) } **A.M.**—Characters of 'White

4. **WHITE WONDER** (Engelmann) } **A.M.**—Characters of 'White

Enchantress,' but flowers (19 a plant) 3-3½ inches diameter, clear white, of good form, petals stiff; a good market flower; flowering best in spring. A later flowerer than 'Wivelsfield White' (37).

1, 2. WIVELSFIELD WHITE (Allwood, Engelmann), A.M.—2-2½ feet; very vigorous, bushy; somewhat similar to 'White Wonder,' but flowers produced a month earlier (22 a plant) (55).

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10. WHITE PEARL (Stuart Low), H.C.—2½ feet; very vigorous, but of slow growth; foliage large and paler than most; flowers (11 a plant) 3½-4 inches diameter, ivory-white when first open, petals fringed (26); resistant to rust and "fairy-ring" diseases.

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12. WHITEALL (Jones), C.—Of 'White Wonder' habit and flower, but calyx weaker and of less vigorous constitution. Average 18 flowers. 'White Perfection' × 'Lady Allington' (39).

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11. CRYSTAL WHITE (Engelmann).—2½ feet; vigorous, though growth somewhat slow; flowers (25 a plant) 3-3½ inches diameter, white with an occasional pink stripe, strongly scented; calyx weak; flowers best in early spring. Raised by the Cottage Gardens Co. (40).

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15. WHITE MAY DAY (Engelmann).—2-2½ feet; compact habit; flowers (20 a plant) 2½-3 inches diameter, ivory-white, open centre, petals entire, round; calyx weak. Sport from 'May Day' (51).

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16. ICEBERG (Jones), A.M.—2½ feet; vigorous, growth somewhat slow; flowers (19 a plant) 3½ inches diameter, white, ivory at first, of very good form, petals almost entire (34).

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14. MRS. LLOYD WIGG (Engelmann).—2½-2¾ feet; very weak; flowers 3-3½ inches diameter; calyx burst. Raised by Messrs. Wells.

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9. WHITE CHIEF (Engelmann).—2 feet; flowers (9 a plant) 2½ inches diameter, white, tinged ivory, very full; calyx short, bursts. Raised by Mr. H. Burnett (35).

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17. WHITE BENORA (Allwood), C.—2 feet; not very strong; flowers (14 a plant) 2½-3 inches diameter, white with an occasional pinkish streak, of good form, outer petals droop. Sport from 'Benora' (27).

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18. SNOWSTORM (Engelmann).—2½ feet; vigorous, produces few side-growth; stems wiry; flowers (15 a plant) white, 3½ inches diameter, some tinged pink, fringed; calyx splits; strongly scented. Raised by Mr. W. Lawrenson (34).

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8. MATCHLESS (Engelmann).—2½ feet; flowers (16 a plant) with faint pink flush at base of petals, 3-3½ inches diameter; sweetly scented. Raised by the Cottage Gardens Co. (31).

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19. CREAM PEARL (Engelmann).—2½ feet; very vigorous; foliage pale; flowers (23 a plant) pale cream, 2½ inches diameter, do not fully open; calyx weak. Raised by Messrs. Allwood (55).

2. Flowers yellow.

AWARDS.

21, 22. **Maine Sunshine**, C. March 29, 1923. Raised by Mr. Strout, and sent by Messrs. Allwood and Engelmann. [A.M. (Allwood, Engelmann) 1922.]

23. **Yellow Stone**, C. March 29, 1923. Raised by Messrs. Dorner, and sent by Messrs. Engelmann. [A.M. (Allwood) 1913.]

25. **LA RAYONNANTE** (Engelmann).—1½ foot; weak and of slow growth; stems weak, drooping; flowers (4 a plant) 3½-4 inches diameter, pale primrose, of poor form, forms an extra bud in centre of flower; calyx splits; late spring flowering. Introduced by Messrs. Allwood (33).

* * *

24. **Saffron** (Engelmann).—2-2½ feet; compact habit; flowers (10 a plant) 2½-3 inches diameter, clear yellow, petals entire, waved; calyx weak; spring flowering. Sport from 'Sunstar' (23).

21, 22. **MAINE SUNSHINE** (Allwood, Engelmann), C.— $2\frac{1}{2}$ feet; inclined to grow tall, produces few side-growths; flowers (14 a plant) $2\frac{1}{2}$ — $3\frac{1}{2}$ inches diameter, high centre, sulphur-yellow, with occasional white blotch, centre petals deeper; December flowering. Of somewhat weak and poor growth the second season (23).

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23. **YELLOW STONE** (Engelmann), C.—2 feet; compact habit; flowers (10 a plant) $2\frac{1}{2}$ —3 inches diameter, pale yellow, sometimes with pinkish-white streaks near margins, centre petals deeper (21).

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26, 27. **SUNBEAM** (Engelmann, Stuart Low).— $2\frac{1}{2}$ feet; vigorous and of quick growth; flowers (10 a plant) $2\frac{1}{2}$ inches diameter, yellow with occasional pink flakes; calyx weak; continual flowerer. Raised by Messrs. Stuart Low in 1917. No. 26 contained cerise rogue (18).

* * *

30. **GOLDEN IDOL** (Engelmann).— $1\frac{1}{2}$ foot; not vigorous; stems short; flowers (6 a plant) 3 inches diameter, pale golden-yellow; calyx short, strong; spring flowering. Raised by Messrs. Allwood (42).

3. Flowers pink.

AWARDS.

35, 36. **Mrs. Walter Hemus, A.M.** March 29, 1923. Raised by Mr. W. Hemus, and sent by Messrs. Engelmann and Allwood. (A.M. Hemus, 1919.)

† 79, 80. **Delice, H.C.** March 29, 1923. Raised by Mr. H. G. Dudney, and sent by Messrs. Engelmann and Allwood. †

† 38. **May Day, H.C.** March 29, 1923. Raised by Mr. C. Knopf, and sent by Messrs. Engelmann. [A.M. (Peed, Bath, Stuart Low) 1909.]

31. **Enchantress, C.** March 29, 1923. Raised by Mr. P. Fisher, and sent by Messrs. Engelmann. [A.M. (Bell & Sheldon) 1904.] †

93. **KING ALBERT** (Engelmann).— $2-2\frac{1}{2}$ feet; of quick growth, forming few side-growths; stems stiff; flowers (9 a plant) $2\frac{1}{2}$ —3 inches diameter, pale cream-pink, petals soft; continuous flowerer. Raised by Mr. A. F. Dutton (23).

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71. **LAURA WEBER** (Engelmaun).— $2-2\frac{1}{2}$ feet; growth somewhat slow; flowers (3 a plant) $2\frac{1}{2}$ — $2\frac{3}{4}$ inches diameter, pale cream-pink, somewhat streaked darker, margins deeper; flowers produced in crops. Raised by Mr. C. Weber (16).

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31. **ENCHANTRESS** (Engelmann), C.— $2\frac{1}{2}$ —3 feet; of bushy habit; flowers (21 a plant) $3\frac{1}{2}$ inches diameter, very pale pink, of good form, petals soft; calyx weak; continuous flowerer (42).

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32. **ALICE** (Engelmann).— $2-2\frac{1}{2}$ feet; habit bushy; flowers (15 a plant) $2\frac{1}{2}$ inches diameter, very pale pink, with a trace of salmon, sweetly scented; calyx burst; free flowering. Raised by Mr. P. Fisher (47).

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79, 80. **DELICE** (Engelmann, Allwood), H.C.— $2\frac{1}{2}$ feet; very bushy; flowers (17 a plant) $3-3\frac{1}{2}$ inches diameter, pale pink, of good form; calyx rather weak; continuous flowerer. Sport from 'Enchantress' (33).

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46. **LADY MEYER** (Engelmann).—Of 'Enchantress' type of flower and growth, but of a somewhat deeper shade; flowers (28 a plant) spotted and streaky in winter. Raised by Mr. E. Guile (60).

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40. **LUCY** (Engelmann).— $2\frac{1}{2}$ feet; flowers (14 a plant) $2\frac{1}{2}$ inches diameter, pale pink, streaked, and of a much deeper shade in winter, petals round; early spring flowering; sweetly scented. Raised by sender (33).

* * *

33. **NANCY** (Engelmann).— $2\frac{1}{2}$ feet; producing few side-growths; flowers (16 a plant) $2\frac{1}{2}$ inches diameter, pale pink, open centre; calyx weak; free flowering (50).

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41. **ALISON** (Engelmann).—Of 'Nancy' type, but of less robust growth and flowers (8 a plant) less fringed. Raised by Messrs. Price & Fyfe (24).

38. MAY DAY (Engelmann), H.C.—2 feet; bushy habit; flowers (25 a plant) $3\frac{1}{2}$ inches diameter, pale soft pink, of good form, petals round, entire; perpetual flowering (53).

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48. NETTIE (Jones).—Of 'May Day' type, but flowers (20 a plant) spotted and streaky in winter, centre of flower loose. Raised by sender (49).

* * *

37. JEANIE (Engelmann).—2 feet; flowers (16 a plant) $2\frac{1}{2}$ inches diameter, pale pink, somewhat streaky in winter; petals almost entire; calyx bursts. Raised by sender (43).

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35, 36. MRS. WALTER HEMUS (Engelmann, Allwood), A.M.— $2\frac{1}{2}$ feet; very vigorous, bushy; stems stiff; flowers (13 a plant) $3-3\frac{1}{2}$ inches diameter, pale pink, fringed, of very good form; calyx bursts in winter; early spring flowering. Very liable to be attacked by rust (36).

* * *

56. PINK SENSATION (Engelmann).— $2\frac{1}{2}$ feet; very vigorous, bushy, slow grower; flowers (5 a plant) $3-3\frac{1}{2}$ inches diameter, pale pink, of good form, petals fringed; calyx bursts; spring flowering. Raised by Messrs. F. Dorner (24).

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34. REX (Engelmann).—2 feet; not very strong; flowers (9 a plant) $2\frac{1}{2}$ inches diameter, pale pink, streaked and flaked in winter; calyx weak. Raised by sender (30).

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44. NORA WICKS (Carpenter).— $2\frac{1}{2}$ feet; of ragged growth; flowers (9 a plant) $3\frac{1}{2}$ inches diameter, shell pink, open centre; calyx bursts; continuous flowerer. Raised by sender (23).

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42. R. F. FELTON (Engelmann).— $2-2\frac{1}{2}$ feet; not very strong; flowers (3 a plant) 3 inches diameter, pale pink; calyx bursts; spring flowering. Raised by Mr. H. Burnett (21).

4. Flowers rose-pink.

AWARD.

53. WINSOR, C. March 29, 1923. Sent by Messrs. Engelmann. [A.M. (Dutton, Lange) 1907.]

52. MORNING GLOW (Engelmann).— $2\frac{1}{2}$ feet; flowers (20 a plant) 3 inches diameter, of good form, very pale rose-pink, fading to white at margins; calyx bursts; perpetual flowering (48).

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89. MRS. A. F. DUTTON (Engelmann).— $2\frac{1}{2}$ feet; not very strong, of somewhat slow growth, produces few side-growths; flowers (14 a plant) $2\frac{1}{2}$ inches diameter, very pale rose-pink, colour runs, margins whitish; calyx weak; free flowering. Sport from 'White Perfection.' Raised by Mr. A. F. Dutton (30).

* * *

73. SATIN ROBE (Engelmann).—2 feet; produces few side-growths; flowers (12 a plant) 3 inches diameter, very pale rose-pink, tinged mauve; calyx weak; early spring flowerer. Raised by Messrs. Stuart Low (39).

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75. RUTH BAUR (Allwood).— $2\frac{1}{2}$ feet; vigorous, forms few side-growths; foliage rather narrow; stems weak; flowers (9 a plant) 3 inches diameter, pale rose-pink, of good form, fades slightly, petals fringed; calyx weak, but does not split; flowers produced in crops, very good in early March. Raised by Messrs. Baur & Steinkamp (29).

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53. WINSOR (Engelmann), C.—2 feet; flowers (10 a plant) $2\frac{1}{2}$ inches diameter, pale rose-pink, margins paler, somewhat open centre; calyx apt to split; perpetual flowering (32).

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54. ALICE COOMBS (Engelmann).—2 feet; not very strong; flowers (13 a plant) 3 inches diameter, pale rose-pink, streaked and flaked in winter, centre open, petals fringed; calyx weak; perpetual flowering. One cream-pink rogue. Raised by Mr. A. F. Roper (37).

55. GLORIA (Engelmann).—2 feet; bushy; flowers (5 a plant) 2½ inches diameter, pale rose-pink, loose, less fringed than 'Alice Coombs'; calyx weak. Raised by Mr. H. W. Field (26).

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49. PATRIE (Engelmann).—2½ feet; of poor constitution; flowers 3 inches diameter, pale rose-pink, petals fringed; calyx weak; did not flower during winter months (4).

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61. PHILADELPHIA (Engelmann).—2½ feet; flowers (18 a plant) 3-3½ inches diameter, pale rose-pink, streaky in January, petals much fringed; calyx splits; free flowering. Raised by Mr. C. T. Starr (47).

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60. ROSE ENCHANTRESS (Engelmann).—Of 'Enchantress' habit, but flowers (18 a plant) a shade darker than 'Philadelphia.' Sport from 'Enchantress' (33).

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47. RÈNE ISABEL (Engelmann).—2½ feet; tends to grow tall; foliage narrow; stems wiry; produces few side-growths; flowers (3 a plant) 3 inches diameter, pale rose-pink, streaked in winter; calyx short, splits. Summer flowering (42).

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64. MRS. AKEHURST (Engelmann).—2-2½ feet; bushy habit; flowers (8 a plant) 3 inches diameter, pale rose-pink, streaky in winter, petals much fringed; calyx weak; free flowering (24).

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72. ROSE-PINK ENCHANTRESS SELECTED (Allwood).—Of 'Enchantress' habit; flowers (21 a plant) of a deeper shade than 'Rose Enchantress.' Sport from 'Enchantress' (47).

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66. DOROTHY GORDON (Engelmann).—Of 'Enchantress' habit, but flowers (12 a plant) somewhat more fringed, and looser, otherwise much like it. Raised by Messrs. J. Heacock (49).

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78. MAISIE (Engelmann).—2½-3 feet; compact; flowers (6 a plant) 3 inches diameter, rose-pink, streaked in winter, of good form; calyx inclined to be weak. Raised by Messrs. Price & Fyfe (34).

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65. WASHINGTON (Engelmann).—Of 'Enchantress' habit; flowers (15 a plant) very bright deep rose-pink. Sport from 'Enchantress' (36).

* * *

69. MRS. C. W. WARD (Engelmann).—2½ feet; flowers (9 a plant) 2½-3 inches diameter, deep rose-pink, fades very much, especially at margins; calyx splits; perpetual flowering. Raised by Cottage Gardens Co. (31).

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70. GOOD CHEER (Engelmann).—2½ feet; of somewhat compact habit; flowers (10 a plant) 2½ inches diameter, deep rose-pink, somewhat streaky in winter, petals entire, waved; flowers produced in crops (31).

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67. NORTHPORT (Engelmann).—2½ feet; flowers (14 a plant) 3 inches diameter, deep rose-pink, burns; of good form; calyx splits; perpetual flowering. Raised by Mr. J. D. Cockcroft (24).

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58. MY ROSE (Engelmann).—2½-3 feet; flowers (14 a plant) 2½-3 inches diameter, deep rose-pink, with a mauve flush; of good form; calyx strong; flowers produced in crops. Raised by sender (33).

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68. ROSE SENSATION (Engelmann).—Of 'Pink Sensation' habit; flowers (7 a plant) deep rose-pink, streaky in winter; early spring flowering. Sport from 'Pink Sensation' (28).

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50. ALBERT ROPER (Engelmann).—2½-3 feet; flowers (8 a plant) 2½-3 inches, deep rose-pink, fades, petals fringed; calyx splits; spring flowering. Raised by Mr. A. F. Roper (32).

5. *Flowers salmon-pink.*

AWARDS.

86, 87. **Enchantress Supreme**, A.M. March 29, 1923. Raised by Messrs. Dalleydowie, and sent by Messrs. Allwood and Engelmann. [H.C. (Allwood, Engelmann) 1922.]

94. **Bona**, A.M. March 29, 1923. Raised and sent by Messrs. Engelmann.

99. **Nora West**, H.C. March 29, 1923. Raised by Mr. G. West, and sent by Messrs. Engelmann.

88. **Lady Northcliffe**, H.C. March 29, 1923. Raised and sent by Messrs. Engelmann. [H.C. (Engelmann) 1922.]

106. **Eisenham Beauty**, H.C. March 29, 1923. Raised by Mr. P. A. Colman, and sent by Messrs. Engelmann.

107. **Lady Inverforth**, H.C. March 9, 1922. Raised and sent by Messrs. Stuart Low. [A.M. (Stuart Low) 1920.]

92. **Queen Alexandra**, C. March 29, 1923. Raised by Mr. G. Clarke, and sent by Messrs. Engelmann. [A.M. (Clarke) 1913.]

62, 63. **Laddie**, C. March 29, 1923. Raised by Messrs. F. Dorner, and sent by Messrs. Engelmann and Allwood. [A.M. (Engelmann) 1920.]

84. **Cupid**, C. March 29, 1923. Raised and sent by Messrs. Engelmann. [A.M. (Engelmann) 1921.]

90, 91. **Mrs. T. Ives**, C. March 29, 1923. Raised by Messrs. Stuart Low, and sent by Messrs. Stuart Low and Engelmann. [A.M. (Stuart Low) 1920.]

101, 102. **Salmon King**, C. March 29, 1923. Raised by Messrs. Stuart Low, and sent by Messrs. Stuart Low and Engelmann. [A.M. (Stuart Low) 1913.]

124. **Malcolm**, C. March 29, 1923. Raised by Messrs. Price & Fyfe, and sent by Messrs. Engelmann. [A.M. (Price & Fyfe) 1915.]

121. **Mary Allwood**, C. March 29, 1923. Raised by Messrs. Allwood, and sent by Messrs. Engelmann. [A.M. (Allwood) 1912.]

92. **QUEEN ALEXANDRA** (Engelmann), C.— $2\frac{1}{2}$ feet; flowers (13 a plant) $2\frac{1}{2}$ —3 inches diameter, pale bright salmon-pink, not very full, petals soft; calyx weak; perpetual flowering. Sport from 'Scarlet Glow' (33).

* * *

86, 87. **ENCHANTRESS SUPREME** (Allwood, Engelmann), A.M.—Of 'Enchantress' habit, but slightly more vigorous; flowers (16 a plant) pale salmon-pink. Sport from 'Enchantress' (38).

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51. **RENOWN** (Allwood).— $2\frac{1}{2}$ feet; bushy; flowers (6 a plant) $2\frac{1}{2}$ inches diameter, pale salmon-pink, fades very much, open centre, petals fringed; calyx weak; flowers produced in crops (21).

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95. **REGINA** (Engelmann).— $2\frac{1}{2}$ feet; very bushy; stems stiff; flowers (11 a plant) $2\frac{1}{2}$ —3 inches diameter, pale bright salmon-pink, petals much fringed; sweetly scented; early spring flowerer. Raised by sender (29).

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83. **COLLEEN** (Engelmann).— $2\frac{1}{2}$ feet; very bushy; stems weak; flowers (9 a plant) $2\frac{1}{2}$ —3 inches diameter, pale salmon-pink, petals somewhat fringed; calyx weak; colour streaky in winter; flowers produced in crops. Raised by sender (47).

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99. **NORA WEST** (Engelmann), H.C.— $2\frac{1}{2}$ feet; bushy; stems stiff; flowers (11 a plant) 3— $3\frac{1}{2}$ inches diameter, pale salmon-pink, of good form; flowers produced in crops (34).

* * *

39. **BARONESS DE BRIENEN** (Engelmann).— $1\frac{1}{2}$ —2 feet; very bushy habit, but of somewhat slow growth; flowers (6 a plant) 3— $3\frac{1}{2}$ inches diameter, pale salmon-pink, petals fringed; stems short, weak; calyx splits. Raised by Messrs. Stuart Low (23).

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105. **NIobe** (Engelmann).— $2\frac{1}{2}$ — $2\frac{1}{2}$ feet; of weak constitution; flowers (7 a plant) $2\frac{1}{2}$ inches diameter, pale salmon-pink, petals slightly fringed; calyx splits; summer flowering. Raised by Messrs. Allwood (23).

100. MRS. H. BURNETT (Engelmann).—2-2½ feet; very bushy; flowers (9 a plant) 2½ inches diameter, pale bright salmon-pink, of good form, petals entire; spring flowering. Raised by Mr. H. Burnett (41).

* * *

81, 82. EILEEN (Stuart Low, Engelmann).—2 feet; growth slow; flowers (15 a plant) 3-3½ inches diameter, pale salmon-pink, of good form, centre somewhat open; flowers produced in crops. Raised by Messrs. Stuart Low (28).

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88. LADY NORTHCLIFFE (Engelmann), H.C.—2½ feet; bushy; flowers (14 a plant) 2½-3 inches diameter, pale salmon-pink, of very good form, colour poor in winter, petals fringed; strongly scented; perpetual flowering (41).

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62, 63. LADDIE (Engelmann, Allwood), C.—2½ feet; vigorous, few side-growths; stems long, stiff; flowers (6 a plant) 3-3½ inches diameter, pale salmon-pink shaded rose, of good form; spring flowering; of weak and poor growth the second season (16).

* * *

84. CUPID (Engelmann), C.—2½ feet; somewhat slow grower; flowers (15 a plant) 3½ inches diameter, pale salmon-pink, of very good form; fades in spring, petals somewhat fringed; perpetual flowering (34).

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90, 91. MRS. T. IVES (Stuart Low, Engelmann), C.—2½-3 feet; very vigorous and bushy; flowers (13 a plant) 2½-3 inches diameter, salmon-pink, fades slightly, centre open, petals serrated; free flowering (32).

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101, 102. SALMON KING (Stuart Low, Engelmann).—2-2½ feet; of somewhat weak growth; flowers (21 a plant) 2½-3 inches diameter, salmon-pink, petals fringed; stems weak; calyx splits; perpetual flowering. Raised by Messrs. Stuart Low (45).

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103. LADY INGESTRE (Engelmann).—2 feet; of weak growth; flowers (8 a plant) 3 inches diameter, salmon-pink, petals almost entire; calyx weak; flowers produced in crops (15).

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106. ELSENHAM BEAUTY (Engelmann), H.C.—2-2½ feet; bushy; flowers (10 a plant) 3 inches diameter, salmon-pink, somewhat open centre; stems stiff; flowers produced mostly in crops. Sport from 'Britannia' (39).

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104. LADY FULLER (Engelmann).—2½ feet; very bushy; flowers (9 a plant) 3-3½ inches diameter, bright salmon-pink, of good form, petals somewhat fringed; stems stiff; calyx weak; flowers produced in crops. Raised by Mr. C. Wall (31).

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96. BEDFORD BELLE (Engelmann).—2-2½ feet; bushy and compact habit; flowers (25 a plant) 2½-2¾ inches diameter, salmon-pink, streaky in winter, of good form; stems and calyx weak; scented; perpetual flowering. Raised by Messrs. Laxton (53).

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219. WIVELSFIELD PINK (Allwood).—2½ feet; produces few side-growths; flowers (14 a plant) 3-3½ inches diameter, pale salmon-pink flushed rose, high centre, sweetly scented; stems stiff; calyx weak; perpetual flowerer. Raised by sender.

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94. BONA (Engelmann), A.M.—2½-2¾ feet; flowers (13 a plant) 2½-3 inches diameter, deep salmon-pink, inclined to be patchy in winter, petals slightly fringed; perpetual flowering (33).

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97, 98. SALMON ENCHANTRESS (Allwood, Engelmann).—Of 'Enchantress' habit; flowers (14 a plant) deep salmon-pink, of much deeper colour in spring. Sport from 'Enchantress' (37).

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107. LADY INVERFORTH (Stuart Low), H.C.—2½ feet; bushy; flowers (8 a plant) 3-3½ inches diameter, deep salmon-pink, colour runs; stems stiff; petals entire; sweetly scented; flowers produced in crops (30).

85. MADELAINE (Engelmann).— $2\frac{1}{2}$ feet; growth slow and wiry; flowers (4 a plant) $2\frac{1}{2}$ inches diameter, pale salmon, petals somewhat fringed; calyx weak; spring flowering (21).

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148. MRS. JAMES ARTHUR (Fulford).— $2\frac{1}{2}$ feet; flowers (12 a plant) 3 inches diameter, deep salmon, fades, petals fringed; calyx weak; free flowering. Raised by sender (34).

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109. MRS. W. B. CLODE (Engelmann).— $2\frac{1}{2}$ feet; growth slow; flowers (2 a plant) $2\frac{1}{2}$ inches diameter, deep salmon, petals slightly fringed; calyx weak; summer flowering. Raised by Mr. H. Burnett (13).

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134. 135. COUNTESS OF PEMBROKE (Engelmann, Stuart Low).— $2\frac{1}{2}$ feet; of compact, bushy habit; stems weak, drooping; flowers (12 a plant) 3 inches diameter, deep rosy-salmon, fades; calyx weak; perpetual flowering. Raised by Messrs. Stuart Low (32).

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197. THE MAJOR (Allwood).— $2\frac{1}{2}$ feet; of weak constitution; flowers (19 a plant) $2\frac{1}{2}$ inches diameter, deep salmon overlaid pale mauve, fades, petals entire; stems weak; free flowering. Raised by Major Prickett. No. 196 also sent under this name, but not true (48).

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121. MARY ALLWOOD (Engelmann), C.— $2\frac{1}{2}$ feet; bushy; flowers (13 a plant) 3 inches diameter, salmon-cerise, fades, streaky in winter, petals broad, entire, high centre; perpetual flowering. No. 120, sent under this name, proved to be 'Marion Willson' (37).

* * *

123. MRS. ARTHUR WILLIAMS (Williams).— $2\frac{1}{2}$ feet; vigorous, forms few side-growths; flowers (17 a plant) 3 inches diameter, salmon-cerise, fades, petals fringed; stems weak; calyx weak; perpetual flowering. Sport from 'Benora' (36).

* * *

124. MALCOLM (Engelmann), C.— $2\frac{1}{2}$ feet; produces few side-growths; flowers (9 a plant) 3 inches diameter, salmon-cerise, slightly fringed; stems stiff; calyx weak; early spring flowering (34).

* * *

143. ROSE DORÉE (Engelmann).— $2\frac{1}{2}$ feet; flowers (8 a plant) 3 inches diameter, deep salmon-red, faintly tinged orange, fades very much, fringed; stems stout, stiff; calyx weak; early spring flowering. Raised by Mr. W. H. Lancashire (25).

* * *

6. Flowers cerise.

AWARDS.

116. PEERLESS, C. March 29, 1923. Raised by Messrs. P. Henderson, and sent by Messrs. Engelmann.

113, 114. NIKKO, C. March 29, 1923. Sent by Messrs. Allwood and Engelmann.

110. ROSETTE (Engelmann).— $2\frac{1}{2}$ feet; flowers (10 a plant) 3 inches diameter, pale bright rosy-cerise, somewhat streaky in winter, of good form, petals fringed; flowers produced in crops. Raised by Messrs. F. Dorner & Sons (30).

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76, 77. DESTINY (Engelmann, Allwood).— $2-2\frac{1}{2}$ feet; flowers (23 a plant) $2\frac{1}{2}$ -3 inches diameter, soft rosy-cerise, margins paler, streaky in winter, petals fringed; strongly scented; perpetual flowering. Raised by Messrs. Allwood (55).

* * *

111. DR. V. G. WARD (Engelmann).— $1\frac{1}{2}$ -2 feet; compact habit; flowers (12 a plant) $2\frac{1}{2}$ inches diameter, bright cerise, fades very much; of good form, petals entire; flowers produced in crops. Raised by Mr. G. Carpenter (27).

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116. PEERLESS (Engelmann), C.— $2\frac{1}{2}$ feet; produces few side-growths; foliage narrow; stems wiry; flowers (18 a plant) 3- $3\frac{1}{2}$ inches diameter, deep cerise, fades, petals fringed; perpetual flowering (32).

119. VINDICTIVE (Allwood).—Character as for 'Peerless,' but flowers (13 a plant) 3 inches diameter, petals slightly fringed; calyx weak; spring flowering. Introduced by sender (31).

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113, 114. NIKKO (Allwood, Engelmann). C.—2½ feet; foliage narrow; stems wiry; flowers (13 a plant) 2½-3 inches diameter, deep cerise, fades, petals entire; calyx weak; perpetual flowering. No. 113 contained pink rogue. Sport from 'Mikado' (49).

* * *

112. ROSALIA (Engelmann).—2½ feet; flowers (8 a plant) 3 inches diameter, deep scarlet-cerise, fades, petals fringed; free flowering. Raised by Messrs. F. Dorner & Sons (28).

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117, 118. WINTER GLOW (Engelmann, Stuart Low).—2½ feet; very bushy; stiff stems; flowers (6 a plant) 2½ inches diameter, deep scarlet-cerise, petals somewhat fringed; spring flowering. Raised by Messrs. Stuart Low (24).

7. Flowers scarlet.

AWARDS.

141. General Joffre, A.M. March 29, 1923. Raised by Mr. G. Clark, and sent by Messrs. Engelmann. [A.M. (Engelmann) 1922.]

132. The Herald, A.M. March 29, 1923. Raised by Chicago Carnation Co., and sent by Messrs. Engelmann. [A.M. (Engelmann) 1922.]

154. Aviator, A.M. March 29, 1923. Raised by Chicago Carnation Co., and sent by Messrs. Engelmann. [A.M. (Engelmann) 1922.]

138. Elspeth, H.C. March 29, 1923. Raised and sent by Mr. W. F. Hamilton.

149. West Hall Scarlet, H.C. March 29, 1923. Raised and sent by Mr. G. Carpenter.

126. Lens, C. March 29, 1923. Raised and sent by Mr. G. Carpenter.

153. Mars, C. March 29, 1923. Raised and sent by Messrs. Engelmann.

151. Brilliant, C. March 29, 1923. Raised by Messrs. Stuart Low, and sent by Messrs. Engelmann. [A.M. (Stuart Low) 1918.]

145. Nebraska, C. March 29, 1923. Raised by Mr. C. H. Fry, and sent by Messrs. Engelmann.

131. VOLCANO (Engelmann).—2½ feet; very vigorous; flowers (20 a plant) 3-3½ inches diameter, pale scarlet, streaky and fades in winter, loose, ragged, fringed; calyx bursts; free flowering. Raised by Messrs. Stuart Low (36).

74. RUTH BAUR (Engelmann).—Identical with 'Volcano.' A misnomer.

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157. COMFORT (Engelmann).—2½ feet; growth somewhat thin; stems stiff; flowers (8 a plant) 2½ inches diameter, bright rosy-scarlet, fades, of fair form, petals somewhat fringed, centre inclined to be loose; early spring flowerer (25).

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147. RED BENORA (Engelmann).—2½ feet; flowers (16 a plant) 2½ inches diameter, scarlet, fades, petals slightly fringed, of good form; calyx weak; perpetual flowering. Sport from 'Benora' (29).

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125. FREEDOM (Carpenter).—2½ feet; flowers (24 a plant) 3 inches diameter, scarlet, fades very much, petals soft, fringed; stems weak; perpetual flowering. Raised by sender (55).

* * *

146. BRITANNIA (Engelmann).—2 feet; bushy; flowers (4 a plant) 2½ inches diameter, scarlet, fades with age, of good form, petals slightly fringed; spring flowering. Raised by Mr. A. Smith (32).

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129, 130. RED ENSIGN (Engelmann, Stuart Low).—2½ feet; bushy; flowers (13 a plant) 2½ inches diameter, scarlet-red, much paler in winter, petals somewhat fringed; calyx weak; perpetual flowering. Raised by Messrs. Stuart Low (31).

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136. SCARLET CAROLA (Engelmann).—2½ feet; growth slow, producing few side-growths; flowers (8 a plant) 3-3½ inches diameter, deep scarlet-red, inner petals with some white streaks, fringed; calyx splits; flowers produced in crops. Raised by sender. Sport from 'Carola' (18).

127. CHAMPION (Engelmann).— $2\frac{1}{2}$ - $2\frac{3}{4}$ feet; bushy; flowers (12 a plant) $2\frac{1}{2}$ -3 inches diameter, bright scarlet, fades with age, with occasional white streaks; stems weak; calyx splits; early spring flowering. Raised by Messrs. F. Dorner & Sons (31).

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128. ETHEL FISHER (Engelmann).— $2\frac{1}{2}$ feet; vigorous, produces few side-growths; flowers (12 a plant) $2\frac{1}{2}$ -3 inches diameter, deep scarlet, fades, petals waved; calyx weak, but does not split; perpetual flowering. Raised by Mr. P. Fisher (23).

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150. SCARLET GLOW (Engelmann).— $2\frac{1}{2}$ feet; flowers (9 a plant) $2\frac{1}{2}$ -3 inches diameter, very bright scarlet, changing to deep rosy-scarlet in winter, fades; streaked in winter; stems and calyx weak; flowers produced in crops. Stock not true. Raised by Messrs. F. Dorner (27).

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126. LENS (Carpenter). C.— $2\frac{1}{2}$ feet; flowers (14 a plant) $3-3\frac{1}{2}$ inches diameter, bright scarlet, open centre, petals fringed, strongly scented; perpetual flowering. Raised by sender (33).

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138. ELSPETH (Hamilton), H.C.— $2\frac{1}{2}$ feet; vigorous, produces few side-growths; flowers (15 a plant) $2\frac{1}{2}$ -3 inches diameter, bright scarlet changing to rosy-scarlet in winter, fringed; calyx splits; flowers produced in crops. Sport from 'Benora' (29).

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137. RED CHENEY (Engelmann).— $2\frac{1}{2}$ feet; bushy; flowers (8 a plant) $2\frac{1}{2}$ -3 inches diameter, scarlet-red flushed carmine, fades very much in winter, fringed; flowers produced in crops. Raised by Messrs. Allwood (26).

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139, 140. BEACON (Engelmann, Allwood).— $2\frac{1}{2}$ feet; vigorous, produces few side-growths; flowers (12 a plant) $2\frac{1}{2}$ inches diameter, deep orange-scarlet, fades, of good form, petals slightly fringed; perpetual flowering. Raised by Mr. P. Fisher (28).

* * *

152. EDWARD ALLWOOD (Allwood).— $2\frac{1}{2}$ feet; flowers (11 a plant) 3 inches diameter, bright scarlet, fades very much, petals entire; of 'Mary Allwood' type of flower; calyx very weak; perpetual flowering. Raised by sender (35).

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156. ST. NICHOLAS (Engelmann).— $2\frac{1}{2}$ feet; flowers (12 a plant) 3 inches diameter, bright scarlet, fringed; calyx weak, but does not split; free flowering. Raised by Messrs. Baur & Steinkamp (31).

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155. MERRY XMAS (Engelmann).— $2\frac{1}{2}$ feet; very vigorous, bushy and compact; flowers (10 a plant) $3\frac{1}{2}$ inches diameter, bright deep scarlet overlaid crimson, of good form, fades with age, petals fringed; stems long, stiff; calyx weak and splits; free flowering. Raised by Messrs. Baur & Steinkamp (32).

* * *

153. MARS (Engelmann). C.— $2\frac{1}{2}$ feet; foliage wiry; flowers (19 a plant) 3 inches diameter, crimson-scarlet, fades, streaked with narrow white lines, fringed; calyx splits; perpetual flowering. Raised by sender (45).

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145. NEBRASKA (Engelmann), C.— $2\frac{1}{2}$ feet; very vigorous; stems rigid; flowers (16 a plant) $3\frac{1}{2}$ inches diameter, scarlet-crimson with occasional white streaks, fades with age; of good form, petals fringed; calyx weak; perpetual flowering. Raised by Mr. C. H. Fry (40).

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151. BRILLIANT (Engelmann), C.— $2\frac{1}{2}$ feet; stems weak; flowers (16 a plant) 3 inches diameter, bright deep scarlet-crimson, fades, fringed; calyx splits; perpetual flowering. Raised by Messrs. Stuart Low (33).

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144. MEG (Engelmann).— $2\frac{1}{2}$ feet; vigorous, forms few side-growths; flowers (11 a plant) 3 inches diameter, bright deep scarlet-crimson, with occasional narrow white streaks at margin, somewhat fringed; stems stiff; free flowering. Raised by Messrs. Price & Fyfe (33).

141. GENERAL JOFFRE (Engelmann), A.M.— $2\frac{1}{2}$ feet; bushy; flowers (17 a plant) 3- $3\frac{1}{2}$ inches diameter, bright orange-scarlet in autumn and winter, but salmon-red in summer, of good form, petals fringed; stems stiff, neck weak; perpetual flowering. Sport from 'Lady Northcliffe' (47).

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142. THOR (Engelmann).— $2\frac{1}{2}$ feet; stems stiff; flowers (12 a plant) 3 inches diameter, bright deep orange-scarlet, fades in spring, petals fringed, soft; free flowering. Raised by sender (38).

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132. THE HERALD (Engelmann), A.M.— $2\frac{1}{2}$ feet; very vigorous, bushy; stems stout, stiff; flowers (17 a plant) 3- $3\frac{1}{2}$ inches diameter, bright deep scarlet, of good form; perpetual flowering (50).

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154. AVIATOR (Engelmann), A.M.— $2\frac{1}{2}$ feet; stems stiff, somewhat wiry; flowers (16 a plant) 3 $\frac{1}{2}$ inches diameter, bright vivid crimson-scarlet, does not fade, of good form, petals fringed; perpetual flowering (41).

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149. WEST HALL SCARLET (Carpenter), H.C.— $2\frac{1}{2}$ feet; bushy; stems stout, stiff; flowers (13 a plant) 3 inches diameter, bright deep crimson-scarlet, of very good form, petals fringed, strongly scented; flowers produced in crops (44).

8. Flowers crimson.

AWARDS.

158, 159. TRIUMPH, A.M. March 29, 1923. Raised by Messrs. Engelmann, and sent by Messrs. Allwood and Engelmann. [A.M. (Engelmann) 1912.]

164. POCOHONTAS, C. March 29, 1923. Raised by Messrs. Baur & Smith, and sent by Messrs. Engelmann. [H.C. (Engelmann) 1922.]

163. CAROLA, C. March 29, 1923. Raised and sent by Messrs. Engelmann. [A.M. (Engelmann) 1909.]

237. MRS. T. M. CROOK (Engelmann).— $2\frac{1}{2}$ feet; of slow growth, forms few side-growths; stems drooping; flowers (12 a plant) $2\frac{1}{2}$ - $2\frac{3}{4}$ inches diameter, pale crimson, striped and flaked deep crimson on white ground, loose, of poor form; calyx weak; free flowering (33).

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165, 166. MRS. EDWARD DOUTY (Stuart Low, Engelmann).— $2\frac{1}{2}$ feet; stems rigid; flowers (11 a plant) 3 inches diameter, deep crimson in winter, changing to crimson overlaid plum in spring, fades, loose, petals fringed; calyx splits; perpetual flowering. Raised by Messrs. Stuart Low (37)

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160. GHIONDA (Engelmann).— $2\frac{1}{2}$ feet; somewhat weak grower, foliage tinged bluish; stems drooping; flowers (5 a plant) 3- $3\frac{1}{2}$ inches diameter, crimson streaked darker and paler, some self-coloured, petals fringed; calyx splits; spring flowering (18).

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217. MAMAN NIGOR (Engelmann).—2 feet; of slow and dwarf growth; flowers (6 a plant) $2\frac{3}{4}$ inches diameter, very deep crimson, irregularly streaked much paler, of good form, petals somewhat fringed; calyx splits; spring flowering (24).

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161. BERNICE (Engelmann).— $2\frac{1}{2}$ feet; not very strong; flowers (10 a plant) 3 inches diameter, crimson streaked darker, fringed; calyx weak; flowers produced in crops. Raised by Mr. W. D. Howard (29).

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162. DORIS (Engelmann).— $2\frac{1}{2}$ feet; of weak growth; stems rigid; flowers (9 a plant) 3 inches diameter, crimson, with occasional white streak, fringed; flowers produced in crops. Raised by Mr. S. J. Goddard (27).

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245. CARMEN (Engelmann).—3 feet; of slow growth, produces few side-growths; stems weak; flowers (9 a plant) $2\frac{3}{4}$ inches diameter, crimson, margins darker, much fringed; calyx splits; free flowering. Raised by Mr. H. Burnett (29).

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164. POCOHONTAS (Engelmann).— $2\frac{1}{2}$ feet; flowers (7 a plant) $3\frac{1}{2}$ inches diameter, deep crimson, of good form, slightly fringed; calyx very weak; flowers produced in crops (24).

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254. NIGGER (Engelmann).—2 feet; stems stiff; flowers $3-3\frac{1}{2}$ inches diameter, bright deep crimson, of good form, petals much fringed; strongly scented; perpetual flowering.

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163. CAROLA (Engelmann).— $2\frac{1}{2}$ feet; stems rigid; flowers (13 a plant) 3 inches diameter, bright deep crimson, with thin white streaks at margins, of good form, petals fringed; calyx splits; flowers produced in crops (28).

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158, 159. TRIUMPH (Allwood, Engelmann). A.M.— $2\frac{1}{2}$ feet; stems rigid; flowers (21 a plant) $3-3\frac{1}{2}$ inches diameter, bright deep rich crimson, of good form, petals much fringed; strongly scented; perpetual flowering (45).

9. Flowers terra-cotta shaded old-rose.

AWARD.

194, 195. Countess of Wilton H.C. March 29, 1923. Raised by Messrs. Stuart Low, and sent by Messrs. Engelmann and Stuart Low. [H.C. (Engelmann, Stuart Low) 1922.]

194, 195. COUNTESS OF WILTON (Engelmann, Stuart Low), H.C.— $2\frac{1}{2}$ feet; bushy; flowers (8 a plant) $2\frac{1}{2}-3$ inches diameter, of good form, petals fringed, very strongly scented; calyx weak; flowers produced in crops (36).

10. Flowers purple.

AWARDS.

184, 185. Wivelsfield Claret, H.C. March 29, 1923. Raised by Messrs. Allwood, and sent by Messrs. Allwood and Engelmann. [A.M. (Allwood) 1920.]

183. Mrs. Hamilton Fellowes, H.C. March 9, 1922. Raised by Messrs. Stuart Low, and sent by Messrs. Engelmann.

183. MRS. HAMILTON FELLOWES (Engelmann), H.C.— $2\frac{1}{2}$ feet; bushy; stems rigid; flowers (12 a plant) $3\frac{1}{2}$ inches diameter, pale bright purplish-magenta, petals slightly fringed; calyx weak; perpetual flowerer (23).

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189. VINCA (Engelmann).— $2\frac{1}{2}$ feet; bushy; stems rigid; flowers (9 a plant) $3\frac{1}{2}$ inches diameter, bright purplish-crimson, of good form, petals fringed; calyx weak; spring flowerer. Raised by sender (29).

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190. GOVERNOR DENEEN (Engelmann).— $2\frac{1}{2}$ feet; bushy; stems somewhat drooping; flowers (10 a plant) $3-3\frac{1}{4}$ inches diameter, bright purplish-crimson, of good form, petals fringed; calyx weak; perpetual flowerer. Raised by Mr. A. C. Brown (21).

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188. GRIZEL (Engelmann).— $2\frac{1}{2}$ feet; stems stout, stiff, tinged purplish; flowers (8 a plant) $2\frac{1}{2}$ inches diameter; bright purplish-crimson, somewhat fringed; flowers produced in crops. Raised by Messrs. Price & Fyfe (19).

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186. MRS. J. KYFFIN (Engelmann).— $2\frac{1}{2}$ feet; bushy; stems rigid; flowers (14 a plant) 3 inches diameter, deep royal purple, of good form, petals fringed; calyx weak; perpetual flowerer (31).

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187. PURPLE ROBE (Engelmann).— $2\frac{1}{2}$ feet; vigorous, produces few side-growths; stems somewhat drooping; flowers (17 a plant) $2\frac{1}{2}$ inches diameter, deep purplish-crimson, petals slightly fringed; calyx splits; flowers produced in crops. Raised by Messrs. Stuart Low (41).

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184, 185. WIVELSFIELD CLARET (Allwood, Engelmann), H.C.— $2\frac{1}{2}$ feet; vigorous, produces few side-growths; stems drooping; flowers (14 a plant) $3\frac{1}{2}$ inches diameter, deep crimson-purple; petals fringed; strongly scented; calyx weak; perpetual flowerer (30).

11. *Flowers white ground fancy.*

AWARDS.

200, 201. **Wivelsfield Wonder**, H.C. March 29, 1923. Raised by Messrs. Allwood, and sent by Messrs. Allwood and Engelmann. [A.M. (Allwood) 1912.]
 205, 206. **Benora**, H.C. March 29, 1923. Raised by Mr. P. Fisher, and sent by Messrs. Allwood and Engelmann. [A.M. (Stuart Low) 1912.]
 234. **Claremont**, H.C. March 29, 1923. Raised and sent by Mr. F. A. Jones.
 202. **Dainty**, C. March 29, 1923. Raised and sent by Mr. F. A. Jones.
 203. **Speckles**, C. March 29, 1923. Raised and sent by Messrs. Engelmann.

199. **ELEGANCE** (Engelmann).—2½ feet; bushy; stems drooping; flowers (18 a plant) 2½ inches diameter, white sparsely striped pink, petals entire; calyx weak; in spring the pink stripes are absent; perpetual flowerer. Sport from 'Enchantress' (41).

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202. **DAINTY** (Jones), C.—2½ feet; stems somewhat weak; flowers (14 a plant) 3 inches diameter, white striped and edged rose-pink, petals fringed; perpetual flowerer (41).

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200, 201. **WIVELSFIELD WONDER** (Allwood, Engelmann), H.C.—2½ feet; flowers (11 a plant) 3 inches diameter, white flaked rose-pink, petals somewhat fringed; calyx weak; perpetual flowerer. No. 200 contained rogue. (28.)

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198. **CHELSEA** (Engelmann).—2½ feet; stems somewhat drooping; flowers (3 a plant) 2½-3 inches diameter, white striped rose-pink, petals fringed; calyx weak; spring flowering. Raised by Mr. A. F. Dutton (26).

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206. **BENORA** (Engelmann) 205. **BENORA SELECTED** (Allwood) } H.C.—2 feet; very vigorous, produces few side-growths; stems rigid; flowers (14 a plant) 3 inches diameter, white striped scarlet, of good form, petals fringed; calyx weak; perpetual flowerer (28).

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207. **MRS. W. CHENEY** (Engelmann).—2½ feet; not very strong; stems somewhat drooping; flowers (3 a plant) 3 inches diameter, white pencilled bright scarlet, petals fringed; calyx weak; spring flowering (22).

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203. **SPECKLES** (Engelmann), C.—2½ feet; bushy; stems rigid; flowers (14 a plant) 3 inches diameter, white heavily dotted with rosy-scarlet, open centre, petals fringed; perpetual flowering. Sport from 'Lady Northcliffe' (38).

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204. **CALYPSO** (Engelmann).—2½ feet; not very strong, compact; stems drooping; flowers (12 a plant) 2½ inches diameter, centre crowded, white lightly pencilled violet-mauve, petals somewhat fringed; calyx splits; perpetual flowering. Raised by Mr. H. Burnett (41).

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233. **GEO. HENSLow** (Engelmann).—3 feet; growth thin, wiry, forms few side-growths; stems drooping; flowers (6 a plant) 3 inches diameter, white, centre of petal suffused rose, fringed, of good form; calyx weak; flowers produced in crops. Raised by Messrs. Stuart Low (16).

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234. **CLAREMONT** (Jones), H.C.—2½ feet; vigorous; stems weak; flowers (9 a plant) 2½-3 inches diameter, white, centre of petal suffused carmine-red, petals slightly fringed; free flowering (24).

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235. **WALTER** (Engelmann).—Characters as for 'Claremont,' but stems drooping; flowers (9 a plant) white, centre of petal suffused scarlet-crimson; calyx splits; free flowering (29).

12. *Flowers pink ground fancy.*

AWARDS.

221. **Toreador**, A.M. March 9, 1922. Raised and sent by Messrs. Allwood [C. (Allwood) 1923.]
 223. **Fancy Carolina**, H.C. March 29, 1923. Raised and sent by Messrs. Engelmann.

236. **Iona**, H.C. March 29, 1923. Raised and sent by Messrs. Engelmann.
 218. **Fanny**, H.C. March 29, 1923. Raised and sent by Messrs. Engelmann.
 242. **Variegated Carola**, C. March 29, 1923. Raised and sent by Messrs. Engelmann.

216. **HELEN M. GOULD** (Engelmann).— $2\frac{1}{4}$ feet; of somewhat bushy habit; stems drooping; flowers (7 a plant) $2\frac{1}{4}$ inches diameter, very pale pink striped deep rose, of good form, petals somewhat fringed; calyx splits; free flowering (16).

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236. **IONA** (Engelmann), H.C.—3 feet; of slow growth; stems somewhat weak; flowers (19 a plant) $3\frac{1}{2}$ inches diameter, pale salmon-pink striped deep scarlet, of good form, somewhat fringed; calyx weak; free flowering (26).

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218. **FANNY** (Engelmann), H.C.— $2\frac{1}{2}$ feet; stems rigid; flowers (13 a plant) $3-3\frac{1}{2}$ inches diameter, pale pink striped and flaked scarlet, fringed, of good form; calyx weak; perpetual flowering (27).

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243. **MRS. M. KINGSCOTE** (Kingscote).—2 feet; stems drooping; flowers (11 a plant) 3 inches diameter, pale pink, striped rosy-carmine, fringed; calyx weak; flowers produced in crops (31).

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220. **WIVELSFIELD FANCY** (Allwood).— $2\frac{1}{4}$ feet; of somewhat ragged growth; stems stiff; flowers (12 a plant) $3-3\frac{1}{2}$ inches diameter, pale pink striped and dotted deep rose-pink, of good form; calyx weak; perpetual flowering. Raised by sender (49).

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221. **TOREADOR** (Allwood), A.M.—Characters as for 'Fanny,' but flowers (12 a plant) pale flesh-pink striped and flaked deep rosy-red (22).

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223. **FANCY CAROLA** (Engelmann), H.C.—2 feet; stems somewhat weak; flowers (17 a plant) $3-3\frac{1}{2}$ inches diameter, pale salmon-pink dotted and striped scarlet, of good form, fringed; calyx splits; flowers produced in crops (39).

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242. **VARIEGATED CAROLA** (Engelmann), C.—Characters as for 'Fancy Carola,' but flowers (18 a plant) pinkish carmine broadly striped and dotted with crimson (46).

13. Flowers yellow ground fancy.

AWARDS.

228. **Jazz**, A.M. March 29, 1923. Raised and sent by Messrs. Engelmann.
 [A.M. (Engelmann) 1922.]

28. **Sunstar**, H.C. March 29, 1923. Raised and sent by Messrs. Engelmann.

211, 212. **Wivelsfield Beauty**, H.C. March 29, 1923. Raised by Messrs. Allwood and sent by Messrs. Allwood and Engelmann.

215. **Harlequin**, H.C. March 29, 1923. Raised and sent by Messrs. Engelmann.

225, 226. **Wivelsfield Apricot**, C. March 29, 1923. Raised by Messrs. Allwood, and sent by Messrs. Allwood and Engelmann. [A.M. (Allwood) 1921.]

229, 230. **Marion Willson**, C. March 29, 1923. Raised by Messrs. Allwood, and sent by Messrs. Engelmann and Allwood. [A.M. (Allwood) 1917.]

224. **BELLA** (Engelmann).— $2\frac{1}{4}$ feet; stems weak; flowers (16 a plant) $2\frac{1}{2}$ inches diameter, apricot suffused brownish, edged pinkish-mauve, centre crowded, petals almost entire, strongly scented; flowers produced in crops. Raised by sender (38).

* * *

211, 212. **WIVELSFIELD BEAUTY** (Allwood, Engelmann), H.C.— $2\frac{1}{2}$ feet; bushy; stems rigid; flowers (17 a plant) 3 inches diameter, pale yellow suffused and flaked pale salmon-pink, of good form, high centre, petals entire; calyx not strong; perpetual flowering (58).

* * *

229, 230. **MARION WILLSON** (Engelmann, Allwood), H.C.—2 feet; stems stiff; flowers (17 a plant) $3-3\frac{1}{2}$ inches diameter, pale lemon-yellow sparsely striped pale scarlet, fringed, of good form, high centre; calyx short, not strong; perpetual flowering (31).

120. **MARY ALLWOOD** (Allwood).—Similar to 'Marion Willson.' A misnomer.

WINTER-FLOWERING CARNATIONS AT WISLEY, 1921-3. 93

28. SUNSTAR (Engelmann), H.C.— $2\frac{1}{2}$ feet; very vigorous, bushy; stems rigid; flowers (12 a plant) $2-2\frac{1}{2}$ inches diameter, yellow striped and flaked deep pink, fringed, of good form; calyx weak; perpetual flowering (33).

* * *

213. MISS WINNIE HEY (Engelmann).— $2\frac{1}{2}$ feet; of slow growth; stems rigid; flowers (4 a plant) $2\frac{1}{2}$ inches diameter, pale primrose striped and edged red, petals entire; calyx weak; spring flowering (13).

* * *

215. HARLEQUIN (Engelmann), H.C.—2 feet; stems not held erect; flowers (16 a plant) $2\frac{1}{2}$ inches diameter, yellow flaked scarlet, especially at margins, centre crowded, of good form; calyx splits; perpetual flowering (45).

* * *

214. FIRE GLOW (Engelmann).— $2\frac{1}{2}$ feet; of slow growth, produces few side-growths; stems rigid; flowers (6 a plant) $2\frac{1}{2}$ inches diameter, yellow edged and flaked at centre of petal scarlet, fringed; calyx weak; spring flowering. Raised by Messrs. Stuart Low (17).

* * *

209. MEPHISTO (Engelmann).— $2\frac{1}{2}$ feet; of somewhat slow growth; stems short, rigid; flowers (3 a plant) 3-4 inches diameter, pale apricot lightly suffused and flaked coral, of poor form; calyx splits; spring flowering. Raised by Messrs. Allwood (13).

* * *

211. SHEILA GREER (Stuart Low).— $2\frac{1}{2}$ feet; stems long, rigid; flowers (10 a plant) $2\frac{1}{2}$ inches diameter, pale apricot-yellow much flaked and edged deep scarlet, slightly fringed, of good form; perpetual flowering. Raised by sender (20).

* * *

210. UNIQUE (Engelmann).—Characters as for 'Sheila Greer,' but flowers of a slightly deeper ground colour and foliage wiry and of a paler shade; calyx weak; flowers produced in crops. Average 4 flowers. Raised by Messrs. Allwood (11).

* * *

228. JAZZ (Engelmann), A.M.— $2\frac{1}{2}$ feet; very vigorous, bushy; stems rigid; flowers (20 a plant) $3\frac{1}{2}$ inches diameter, orange-yellow, broad flakes of scarlet, fringed, high centre, of good form, strongly scented; perpetual flowerer (48).

* * *

225, 226. WIVELSFIELD APRICOT (Engelmann, Allwood), C.— $2\frac{1}{2}$ feet; stems somewhat rigid; flowers (18 a plant) 3 inches diameter, deep apricot, centre deeper, with occasional pinkish-mauve flakes, fringed, of good form; perpetual flowerer (27).

* * *

232. ELEKTRA (Engelmann).—2 feet; bushy; stems weak, drooping; flowers (20 a plant) 3 inches diameter, pale orange-apricot lightly edged coral, high centre, petals entire; calyx weak; perpetual flowering. Raised by sender (48).

* * *

227. MRS. R. GERRISH (Stuart Low).— $2\frac{1}{2}$ feet; of slow growth; stems rigid; flowers (6 a plant) 3 inches diameter, very deep apricot suffused coral, margins darker, of good form, petals cut; calyx weak; spring flowerer. Raised by sender (13).

* * *

14. *Flowers of mauve and violet shades.*

AWARDS.

171, 172. BISHTON WONDER, H.C. March 29, 1923. Raised by Messrs. Allwood, and sent by Messrs. Allwood and Engelmann.

174. Mikado

175. Mikado selected } H.C. March 29, 1923. Raised by Mr. H. Burnett and sent by Messrs. Engelmann and Allwood.

173. Czarina, C. March 29, 1923. Raised by Mr. H. Burnett and sent by Messrs. Engelmann.

238, 239. Circé, C. March 29, 1923. Raised by Messrs. Engelmann and sent by Messrs. Stuart Low and Engelmann.

167. VIOLET VIVIAN (Engelmann).—2 feet; of poor growth; stems drooping; flowers (8 a plant) 3 inches diameter, soft pinkish-mauve, slightly fringed; calyx weak; flowers produced in crops. Raised by Messrs. Allwood (18).

168. MAUVEEN (Engelmann).— $2\frac{1}{2}$ feet; stems somewhat drooping; flowers (16 a plant) $2\frac{1}{4}$ inches diameter, pinkish-mauve, petals almost entire; calyx splits; free flowering (42).

* * *

177. LA MODE (Engelmann).— $2\frac{1}{2}$ feet; bushy; foliage tinged bluish; stems stiff; flowers (7 a plant) $2\frac{1}{4}$ inches diameter, pinkish-mauve, base reddish, of good form, petals almost entire; calyx weak; early spring flowerer. Raised by sender (24).

* * *

171, 172. BISHTON WONDER (Allwood, Engelmann), H.C.—2 feet; very bushy; stems drooping; flowers (20 a plant) 3 inches diameter, bright rose-pink suffused mauve, fringed, of good form, strongly scented; calyx very weak; flowers produced in crops (36).

* * *

173. CZARINA (Engelmann), C.— $2\frac{1}{2}$ feet; stems somewhat stiff; flowers (11 a plant) $2\frac{1}{4}$ inches diameter, pale rose suffused and striped mauve, petals almost entire; calyx weak; flowers produced in crops (31).

* * *

169. ESMÉ (Jones).— $2\frac{1}{2}$ feet; stems rigid; flowers (10 a plant) $2\frac{1}{2}$ – $2\frac{3}{4}$ inches diameter, rose-pink streaked deep violet-mauve; calyx weak; flowers produced in crops. Raised by sender (36).

* * *

176. FAIRMOUNT (Engelmann).—2 feet; of slow growth, bushy; stems drooping; flowers (3 a plant) 3 inches diameter, very pale heliotrope suffused red at base of petals, slightly fringed; calyx splits; spring flowering. Introduced by Messrs. Allwood (25).

* * *

181, 182. EASTERN MAID (Engelmann, Allwood).— $2\frac{1}{2}$ feet; produces few side-growths; stems somewhat drooping; flowers (20 a plant) 3 inches diameter, pale heliotrope flushed bright rose, colour runs, of good form, petals almost entire; calyx weak; flowers produced in crops. Raised by Messrs. Allwood (37).

* * *

170. CREPUSCLE (Engelmann).—2 feet; foliage tinged bluish; stems short, weak and drooping; flowers (5 a plant) $2\frac{1}{4}$ inches diameter; forms an extra bud in centre of expanded flower; pale apricot-pink suffused and edged pale violet-mauve, of poor form; calyx splits; spring flowering (29).

* * *

178, 179. COQUETTE (Stuart Low, Engelmann).— $2\frac{1}{2}$ feet; of somewhat weak growth; stems rigid; flowers (18 a plant) $2\frac{1}{4}$ inches diameter, heliotrope striped and flaked pinkish-mauve, fades, petals slightly fringed; calyx weak; perpetual flowering. Raised by Messrs. Engelmann (29).

* * *

241. CINDERELLA (Engelmann).— $2\frac{1}{2}$ feet; stems drooping; flowers (10 a plant) 3 inches diameter, deep mauve broadly striped scarlet, fades, petals entire, of good form; calyx weak; flowers produced in crops. Raised by Messrs. G. Fairbairn (34).

* * *

240. CARNIVAL (Engelmann).— $2\frac{1}{2}$ feet; foliage tinged bluish; stems somewhat drooping; flowers (10 a plant) $2\frac{1}{4}$ –3 inches diameter, cerise striped and flaked deep heliotrope, of good form; calyx splits; perpetual flowering. Raised by sender (26).

* * *

238, 239. CIRCE (Stuart Low, Engelmann), C.—Characters as for 'Carnival,' but flowers (6 a plant) $3-3\frac{1}{2}$ inches diameter, heliotrope striped and flaked cerise, much fringed; calyx very weak; perpetual flowering (18).

* * *

174. MIKADO (Engelmann)

175. MIKADO SELECTED (Allwood) } H.C.— $2\frac{1}{2}$ feet; foliage wiry; flowers (14 a plant) 3 inches diameter, pale mauve-heliotrope, of good form, petals entire; calyx weak; perpetual flowering (48).

* * *

192. BETA (Engelmann).— $2\frac{1}{2}$ feet; growth slow, wiry; foliage tinged bluish; stems drooping, wiry; flowers (7 a plant) 3 inches diameter, deep satiny violet-mauve; calyx short, splits; spring flowering. Raised by sender (35).

180. **ELSIE BOYD** (Engelmann).—2 feet; compact habit; stems somewhat drooping; flowers (4 a plant) $2\frac{1}{2}$ inches diameter, deep old rose suffused mauve, petals cut; centre crowded; calyx short, splits; early spring flowering. Raised by Messrs. Stuart Low (24).

B. PERPETUAL MALMAISON TYPES.

1. Flowers white.

13. **ALBINO** (Engelmann).— $1\frac{1}{2}$ -1 foot; not very strong; stems short, stiff; flowers (10 a plant) $3\frac{1}{2}$ -4 inches diameter, centre crowded, white, of good form, petals almost entire, strongly scented; calyx splits; perpetual flowering. Raised by sender (27).

* * *

20. **PENELOPE** (Hamilton).— $1\frac{1}{2}$ -2 feet; very vigorous, compact, of slow growth; stems rigid; flowers (1 a plant) $3\frac{1}{2}$ -4 inches diameter, very pale cream, centre crowded, petals fringed; calyx splits; spring flowering. Raised by sender (13).

2. Flowers yellow.

AWARD.

29, 247. **JESSIE ALLWOOD, H.C.** March 29, 1923. Raised by Messrs. Allwood, and sent by Messrs. Allwood and Engelmann.

29, 247. **JESSIE ALLWOOD** (Engelmann), **H.C.**— $1\frac{1}{2}$ -2 feet; of somewhat weak growth; stems rigid; flowers (12 a plant) 4 inches diameter, clear yellow, of good form, petals slightly fringed; calyx short, splits; perpetual flowering (29).

3. Flowers of pink shades.

AWARDS.

250. **ATLANTIC, A.M.** March 29, 1923. Raised and sent by Messrs. Allwood.

251. **OCEANIC, A.M.** March 29, 1923. Raised and sent by Messrs. Allwood.

252. **GIGANTIC, H.C.** March 29, 1923. Raised and sent by Messrs. Allwood.

250. **ATLANTIC** (Allwood), **A.M.**—2 feet; stems rigid; flowers (10 a plant) $4-4\frac{1}{2}$ inches diameter, creamy-white, inner petals splashed pink, centre crowded, of good form, petals almost entire; calyx rather weak; flowers produced in crops in spring (26).

* * *

252. **GIGANTIC** (Allwood), **H.C.**—Characters as for 'Atlantic,' but $2\frac{1}{2}$ feet; flowers (8 a plant) white flushed rose-pink (18).

* * *

251. **OCEANIC** (Allwood), **A.M.**—Characters as for 'Atlantic,' but flowers (6 a plant) very pale rose-pink; flowers produced in early spring (22).

* * *

59, 246. **HUGH LOW** (Stuart Low, Allwood).— $1\frac{1}{2}$ foot; very vigorous; stems rigid; flowers (8 a plant) $3-3\frac{1}{2}$ inches diameter, pale rose-pink, centre crowded, petals slightly fringed; calyx splits; perpetual flowering. Raised by Messrs. Stuart Low (26).

* * *

45. **VENUS** (Engelmann).—2 feet; of slow growth; flowers (1 a plant) 3 inches diameter, of poor form, rose-pink, petals almost entire; calyx splits; late spring flowerer (14).

* * *

108, 248. **MRS. MYLES KENNEDY** (Stuart Low, Allwood).— $1\frac{1}{2}$ foot; stems rigid; flowers (5 a plant) $3\frac{1}{2}$ inches diameter, deep salmon-pink, of good form, strongly scented; calyx splits; perpetual flowering. Raised by Messrs. Stuart Low (27).

* * *

249. **CEDRIC** (Allwood).— $2\frac{1}{2}$ feet; stems rigid; flowers (8 a plant) $4-4\frac{1}{2}$ inches diameter, white, inner petals flushed pale carmine, margins darker, centre crowded, of good form; calyx splits; early spring flowering. Raised by sender (19).

* * *

208. **MARMION** (Engelmann).—Characters as for 'Cedric,' but less vigorous; flowers (7 a plant) $3-3\frac{1}{2}$ inches diameter, creamy-white overlaid deep carmine; flowers produced in crops. Raised by Mr. H. Burnett (28).

4. *Flowers cerise.*

AWARD.

115. **Boadicea**, C. March 29, 1923. Raised and sent by Messrs. Engelmann.

115. BOADICEA (Engelmann), C.— $2\frac{1}{4}$ feet; stems rigid; flowers (6 a plant) 4– $4\frac{1}{2}$ inches diameter, pale bright cerise, of very good form, strongly scented; calyx splits; free flowering, especially in January (18).

* * *

122. MRS. C. F. RAPHAEL (Engelmann).— $2\frac{1}{2}$ feet; very vigorous, bushy; stems stiff; flowers (6 a plant) 4–5 inches diameter, centre loose, salmon-cerise, of very good form, strongly scented; calyx splits; spring flowering. Raised by Mr. H. Burnett (23).

5. *Flowers terra-cotta.*

193, 253. HON. CHARLOTTE KNOLLYS (Stuart Low, Allwood).— $2\frac{1}{2}$ –3 feet; very vigorous; stems very long, rigid; flowers (4 a plant) 4–5 inches diameter, terra-cotta, of good form; calyx weak; late spring flowering. Raised by Mr. H. Burnett (18).

DWARF TROPAEOLUMS AT WISLEY, 1923.

SIXTY-SEVEN stocks of Dwarf Tropaeolums were sent to Wisley for trial in 1922. The seed was sown singly in "sixty" pots on April 10, and the seedlings were planted in their permanent quarters on June 1, one foot apart each way.

A considerable number of stocks sent in proved to be untrue: either they contained rogues or were not fixed.

AWARDS, NOTES, AND DESCRIPTIONS.

A. FOLIAGE NOT VARIEGATED.

1. *Flowers creamy-white.*

1, 2. SNOW QUEEN (A. Dickson, R. Veitch).—Height 9 inches; foliage medium bright green; flowers of medium size, pale maize-yellow, margins paler. Variable in shade.

3. LILLIPUT SNOW QUEEN (Barr).—Similar to Nos. 1, 2. A true stock.

* * *

4. PEARL (Barr).—Characters as for 'Snow Queen,' but flowers somewhat larger and without pale margins. Of very poor germination.

2. *Flowers golden-yellow.*

6. GOLDEN KING (Watkins & Simpson) } —Height 10 inches; foliage medium

7. GOLDEN KING SELECTED (Barr) } bright blue-green; flowers of medium size, deep golden yellow. No. 6 contained pale foliage rogues.

5. GOLDEN YELLOW SELECTED (Dobbie).—Similar to 'Golden King,' but contained pale foliage rogues.

3. *Flowers yellow blotched scarlet.*

10. PRINCE HENRY (Barr).—Height 10 inches; foliage medium bright green; flowers large, pale lemon-yellow, blotched scarlet at throat. Germination poor.

* * *

9. SPOTTED KING (Barr).—Height 8 inches; foliage dark blue-green; flowers large, deep golden-yellow blotched scarlet at throat. Variable in shade.

4. *Flowers rose-carmine.*

17. COERULEUM ROSEUM (Barr).—Height 11 inches; foliage medium bright green; flowers of medium size, bright rose-carmine. Very variable in shade.

18. CARDINAL ROSE (A. Dickson).—Similar to No. 17. Very variable in shade.

* * *

19. KING CARMINE (R. Veitch).—Height 10 inches; foliage dark bright green; flowers large, bright rose-carmine. Stock not true.

20. CARMINE KING (Barr).—Similar to 'King Carmine.' Stock not true.

* * *

21. LILLIPUT RUBY (Barr).—Height 12 inches; foliage medium bright green; flowers of medium size, deep rose-carmine. Variable in colour of foliage and flowers.

22. RUBY KING SELECTED (Barr).—Too much like 'Lilliput Ruby,' of a somewhat deeper shade. Stock not quite true.

5. *Flowers bronze.*

11. BRONZE (Barr).—Height 11 inches; foliage medium bright green; flowers large, Mars yellow.

12. H. M. STANLEY (Barr).—Identical with 'Bronze.'

6. *Flowers terra-cotta.*

13, 14. TERRA-COTTA (Barr, R. Veitch).—Height 1 foot; foliage medium bright green; flowers of medium size, orange-buff flushed scarlet. Stocks not quite true.

16. AURORA (Barr).—Similar to 'Terra-Cotta,' but flowers somewhat larger. Not quite true.

* * *

15. VESUVIUS (Barr).—Height 11 inches; foliage dark blue-green; flowers very large, grenadine. Stock not true.

7. *Flowers orange-scarlet.*

61, 62. CLOTH OF GOLD (Carter, Barr).—Height 14 inches; foliage medium bright yellowish-green; flowers large, deep orange flushed scarlet, hidden by foliage.

8. KING GOLDEN (R. Veitch).—Similar to 'Cloth of Gold.' A misnomer.

* * *

36, 37, 38. FELTHAM BEAUTY (Watkins & Simpson, A. Dickson, R. Veitch).—Height 11 inches; foliage medium bright green; flowers large, bright orange-scarlet. Variable in colour of flower and foliage. Raised by Messrs. Watkins & Simpson.

32. TOM THUMB SCARLET (Carter).—Similar to 'Feltham Beauty.'

33. SCARLET SELECTED (Dobbie).—Similar to 'Feltham Beauty.'

26. FIREBALL (Barr).—Similar to 'Feltham Beauty.' A misnomer.

* * *

28, 29. BEAUTY OF MALVERN (Barr, Nutting).—Characters as for 'Feltham Beauty,' but flowers of a somewhat deeper shade. Stocks vary in colour of flower and foliage.

8. *Flowers scarlet.*

AWARD.

27. FIREBALL, A.M. July 27, 1923. Raised by Messrs. Watkins & Simpson, and sent by Messrs. Nutting of London.

30. ROSY MORN (Watkins & Simpson).—Height 11 inches; foliage medium bright green; flowers large, bright rosy-scarlet. Stock not quite true. Raised by sender.

* * *

27. FIREBALL (Nutting), A.M.—Height 8 inches; foliage dark bright blue-green; flowers large, deep scarlet.

23, 24, 25. FIREBALL (Watkins & Simpson, R. Veitch, A. Dickson).—Variable stocks of No. 27.

34. SCARLET KING SELECTED (Barr).—Similar to 'Fireball.' Stock not quite true.

9. *Flowers crimson.*

AWARD.

39. EMPRESS OF INDIA, H.C. July 27, 1923. Raised and sent by Messrs. J. Carter of Raynes Park, S.W.

39. EMPRESS OF INDIA (Carter), H.C.—Height 9 inches; foliage dark bright blue-green; flowers large, deep crimson-scarlet.

40-45. EMPRESS OF INDIA (Watkins & Simpson, Barr, Toogood, R. Veitch, Zwaan & de Wiljes, Nutting).—Less good stocks of No. 39. Nos. 41, 42 contained rogues.

46. CRIMSON SELECTED (Dobbie).—Similar to 'Empress of India'; requires further selection.

* * *

49. KING THEODORE (Barr).—Height 10 inches; foliage dark bright blue-green; flowers large, deep crimson-maroon. Stock not quite true.

* * *

48, 67. GOLDEN MIDNIGHT (A. Dickson, Barr).—Height 9 inches; foliage medium yellowish-green; flowers large, deep crimson-maroon. No. 67 not quite true.

B. FOLIAGE VARIEGATED WITH CREAMY-WHITE.

1. *Flowers cream blotched carmine.*

52. SILVER QUEEN (Watkins & Simpson)
 53. QUEEN OF TOM THUMBS SILVER QUEEN (Barr) } —Height 8 inches ; flowers
 large, cream blotched carmine at base. No. 52 variable in shade ; No. 53 con-
 tained rogues. Raised by Messrs. Watkins & Simpson.

2. *Flowers yellow.*

54. QUEEN OF TOM THUMBS PRIMROSE (Barr).—Height 8 inches ; flowers
 very large, pale primrose. Stock requires further selection.

* * *

55. QUEEN OF TOM THUMBS GOLDEN YELLOW (Barr).—Height 9 inches ;
 flowers very large, golden-yellow, fades. Stock not quite true.

3. *Flowers scarlet.*

59, 60. QUEEN OF TOM THUMBS SCARLET (Barr, Toogood).—Height 9 inches ;
 flowers very large, bright deep orange-scarlet. Stocks not quite true.

31. QUEEN OF TOM THUMBS (A. Dickson).—Similar to No. 59. Stock not
 quite true.

35. QUEEN SCARLET BEAUTY (R. Veitch).—Similar to No. 59. Stock not
 quite true.

58. QUEEN OF TOM THUMBS ROSY SCARLET (Barr).—Similar to No. 59.

56. QUEEN OF TOM THUMBS ORANGE (Barr).—Similar to No. 59.

63. RYBURGH PERFECTION (Stark).—Similar to No. 59. Raised by sender.

* * *

57. RYBURGH VERMILION (Stark).—Height 8 inches ; flowers large, rosy-
 scarlet. Raised by sender.

4. *Flowers crimson.*

50. TOM THUMB CRIMSON (Carter).—Height 12 inches ; flowers very large,
 crimson-brown. Stock requires further selection.

64, 65. QUEEN OF TOM THUMBS CRIMSON (Toogood, Barr).—Similar to
 No. 50. Stocks require further selection.

66. QUEEN OF TOM THUMBS MAROON-CRIMSON (Barr).—Similar to No. 50.
 Stock not quite true.

47. QUEEN OF TOM THUMBS (R. Veitch).—Similar to No. 50. Requires
 further selection.

5. *Flowers mixed.*

51. LILLIPUT NEW HYBRIDS (Barr).—Height 11 inches ; some plants
 variegated, some not ; flowers of mixed colours.

EARLY-FLOWERING CHRYSANTHEMUMS AT WISLEY, 1923.

THE trial of early-flowering Chrysanthemums at Wisley in 1923 was handicapped to some extent by inequalities in the condition of stocks received from different sources, but more by the adverse nature of the season. Cold weather with sharp frosts hindered the planting out, drought checked development in early summer, and early frosts threatened the destruction of the plants in mid-September. In spite of all this the plants made good growth, and, though nearly a month later than in a normal season, they flowered well, and continued in flower until finally cut down by frost on November 9. From mid-September to the end of October the plants were protected at night by a cover of thin canvas, which prevented damage by the frequent frosts and heavy rains.

The plants were put out at the end of May, being planted in clumps of three in ground that had been well dug and manured during the previous winter. Apart from the removal of the first flower buds in some cases, staking, and tying, the plants were allowed to grow naturally, no disbudding being done. Flowering began about the first week in September, and varieties opened successively as the season advanced. The order of flowering may be gathered from the notes given below, but the actual dates may be taken as three weeks or a month later than they would be in a good season. Some varieties failed to flower in time to be included, and these may be taken as unreliable for outdoor cultivation in most years. A list of these is given at the end.

The trial included 453 stocks, representing 299 names, some of which were synonyms, the actual number of varieties being about 270.

During the progress of the trial members of the Wisley Garden Committee were deputed to select the twelve varieties which, in their opinion, at the time they saw the trials (when most of the varieties were in full bloom), were the most desirable for growing in the majority of gardens. Their choice fell upon the following (for notes see below) :

White varieties : September White.

Candida.

Pale yellow : Framfield Early Primrose.

Yellow : Hollicott Yellow.

Horace Martin.

Orange-yellow : Golden Almirante.

Bronze : Mrs. Jack Pearson.

Bronze Goacher.

Chestnut : Almirante.

Chestnut-crimson : Red Almirante.

Pink : Normandie.

Purple : Lichfield Purple.

A sub-committee of the Floral Committee examined the plants upon several occasions, and made recommendations for awards as noted below. It will be seen that about half the varieties singled out

for awards were old ones which had previously been given awards; the remainder were nearly all new introductions, in many cases superseding old varieties.

Few pink varieties were of outstanding merit, and the single varieties, charming as they are under glass, did not prove on the whole good bad-weather plants. Most of them lack the sturdy habit necessary to withstand the battering of autumnal rains and winds.* Several doubles also with pale reverse to the rays proved poor in wet weather; they are apt to take on a bedraggled appearance.

In the following notes we have followed the classification adopted in reporting the trial of 1914, and in each section have placed the paler forms first, passing to the darker shades of the section.

NOTES AND DESCRIPTIONS.

DECORATIVE VARIETIES.

Flowers white.

† **Framfield Early White, A.M.** October 22, 1923. Sent by Messrs. Bath (Wisbech), Dobbie (Edinburgh), and Jones (Lewisham). Raised by Mr. N. Davis (**A.M. 1912**).

September White, A.M. October 8, 1923. Sent by Messrs. Dobbie, Jones, Bath, and Godber (Willington, Bedford). Raised by Mr. Adecock.

Roi des Blancs, A.M. October 8, 1923. Sent by Messrs. Dobbie, Jones, Godber, Bath, and Barr (Taplow). Raised by M. Nonin (**A.M. 1914**).

† **Candida, A.M.** October 22, 1923. Sent by Messrs. Lowe & Shawyer (Uxbridge), Dobbie, Jones, W. H. Simpson (Birmingham), Barr, Godber. Raised by Mr. J. W. Scott, 1912.

Blanche du Poitou, H.C. October 22, 1923. Sent by Mr. Godber (**A.M. Wells, 1920**).

Miss G. K. Thorpe, H.C. October 8, 1923. Sent by the raiser, Mr. Thorpe of Lichfield.

FRAMFIELD EARLY WHITE (Dobbie, Jones) } **A.M.**—Described vol. 40, p. 518.
FRAMFIELD WHITE (Bath, Barr) } Flowering from October 13.

CISSSBURY WHITE (Jones).—Like last, of which it is a sport, but more incurved. Flowering from October 13. Raised by Mr. Aish.

BLANCHE DU POITOU (Godber), **H.C.**—Taller than last, erect, with stout stems bearing 3½-inch compact white flowers. Flowering from October 22.

SEPTEMBER WHITE (Dobbie, Jones, Bath, Godber), **A.M.**—A very fine variety, 3 feet in height, bushy, very free flowering, with stout stems bearing 4- to 4½ inch flowers with broad incurved rays. Buds cream, rays occasionally streaked carmine. Flowering from September 11. Said to be a sport from 'Mme. Julian Valat.' Raised by Mr. Adecock.

ROI DES BLANCS (Dobbie, Jones, Godber, Bath, Barr), **A.M.**—See vol. 40, p. 518. Stems weaker than last, rays narrower and somewhat curled, and inflorescence looser. Flowering from September 28.

BLANCHE NIEGE (Bath).—Habit erect, 3 feet, bushy. Flowers 3½ inches, white, centre creamy; rays of medium width, flat. Flowering from October 13. Raised by M. Nonin.

MARKET WHITE (Dobbie).—Described vol. 40, p. 518. Rather more spreading than last. Flowering from October 13.

PERPETUAL WHITE (Bath, Dobbie).—2 feet, bushy, rather straggling. Flowers 3 to 3½ inches, white, centre creamy; rays broad. Pinkish in bud. Flowering from September 20. Raised by Mr. Thorpe.

MRS. T. WARD (Jones).—3½ feet, stiff, erect, bushy. Flowers white, centre creamy, 3½ inches, stalks very stout. Flowering from October 28. Raised by Mr. N. Davis.

* There is a tendency, apparently, for raisers to keep too many almost semi-double varieties, which give flowers of bad form and rather evanescent.

† For synonyms, see notes.

D. R. ROBERTSON (Dobbie).—3 feet, bushy, flowers $2\frac{1}{2}$ inches; rays broad, rather pointed. Flowering from October 20.

CHARLEY, from Messrs. Barr, contained two plants of 'D. R. Robertson.'

WHITE O. J. QUINTUS (Jones).—3 feet, rays rather narrower than in the last. Flowering from October 22.

CANDIDA (Lowe & Shawyer), A.M.—3 feet, compact and bushy. Flowers 3 inches, white; rays of medium width, flat. Very free. Flowering from October 22.

Stocks sent under the name 'Sanctity' by Messrs. Dobbie, Jones, W. H. Simpson, Barr, and Godber, and as 'Excelsior' by Messrs. Bath, were identical with 'Candida,' and share the award.

MARY COLVIN (Thyne).—Much like last, but rather earlier and a clearer white. Flowering from October 20. A sport from 'White Countess.'

LOW'S WHITE (Jones).—Rather taller and with greyer foliage than 'Candida,' but near it. Flowering from October 22.

LICHFIELD EARLY WHITE (Thorpe).—A seedling from 'Candida,' raised by the sender. $3\frac{1}{2}$ feet, bushy, compact, sturdy. Flowers $3\frac{1}{2}$ inches; rays white with a greenish tip, broad. Flowering from October 5.

WHITE COUNTESS (Dobbie).—Described vol. 40, p. 518. Flowering from October 20.

WHITE HOPE (Barr).— $3\frac{1}{2}$ feet, very compact. Flowers white, 3 inches; rays narrower than last, rather loose. Flowering from October 20.

MISS G. K. THORPE (Thorpe), H.C.— $3\frac{1}{2}$ feet, fairly compact. Flowers large, $4\frac{1}{2}$ inches, white, very pale cream in centre; rays broad, outer reflexed, inner incurved. Flowering from September 25. Raised by Mr. Thorpe. (Other stocks sent under this name were really 'Silver Lining,' q.v.)

PLUIE D'ARGENT (Barr, Proctor).—Described vol. 40, p. 518. Flowering from September 28.

Flowers creamy-white.

* RALPH CURTIS, A.M. October 8, 1923. Sent by Messrs. Jones, Dobbie, and Bath.

CREAM PERRIER, H.C. October 8, 1923. Sent by Messrs. Dobbie.

EDITH (Jones).—3 feet, compact, foliage grey. Flowers 3 inches, somewhat incurved; rays broad, tinged pink on cream ground. Flowering from October 1. Raised by sender.

CALEDONIA (Dobbie, Bath).—Described vol. 40, p. 517. Flowering from September 28.

HOLMES' WHITE (Bath).—Described vol. 40, p. 518. Flowering from September 11.

L'ESPÉRANCE (Bath).—3 feet, bushy. Flowers pale cream, $3\frac{1}{2}$ inches; rays broad, inner incurved. Flowering from September 30.

CREAM PERRIER (Dobbie), H.C.—2 feet, fairly compact, bushy. Flowers 4 inches, pale cream, deeper in middle and faintly flushed pink outside. Flowering from September 11.

RALPH CURTIS (Jones), A.M.—2 feet, compact and bushy. Flowers $3\frac{1}{2}$ –4 inches, pale cream with faint pink flush; rays pointed. Flowering from September 11. 'Mrs. Bailey' (Bath), 'Tuckswood Early' (Dobbie), and 'White Masse' (Dobbie, Jones), all sports from 'Mme. M. Masse,' were indistinguishable and share the award.

Flowers pale yellow.

CHARMING, A.M. October 8, 1923. Raised and sent by Mr. Jones.

* FRAMFIELD EARLY PRIMROSE, A.M. October 22, 1923. Sent by Messrs. Bath, Jones, Barr, Dobbie. Raised by Mr. N. Davis.

CHATILLON, H.C. October 22, 1923. Sent by Messrs. Bath. Raised by M. Nonin.

ETHEL (Dobbie).—Of 'Masse' type; see vol. 40, p. 525. Flowering from September 11.

MISS NELLIE WEBBER (Webber).—A cream sport from 'Cream Masse.' Flowering from October 1. Almost exactly like 'Ethel.'

CHARMING (Jones) A.M.— $2\frac{1}{2}$ feet, bushy. Flowers $3\frac{1}{2}$ inches, cream, very compact; rays medium width, slightly quilled and pointed. Flowering from September 11. Raised by sender.

* For synonyms, see notes.

FRAMFIELD EARLY PRIMROSE (Bath), **A.M.**—Like 'Framfield Early White,' but primrose. Flowering from October 9.

Sent also as 'Southover Yellow' (Jones, Barr) and 'Willington Early Yellow' (Dobbie).

CANARIENSE (Bath).—See vol. 40, p. 526. Flowering from September 28.

CHÂTIILLON (Bath), **H.C.**— $3\frac{1}{2}$ feet. Flowers 3 inches, buff-lemon; rays medium, flat, inner incurved. Flowering from October 5.

Flowers yellow.

* **Horace Martin**, **A.M.** October 8, 1923. Sent by Messrs. Jones, Bath, and Dobbie. Raised by Mr. E. W. Wallace (**A.M.** 1910).

* **Hollilett Yellow**, **A.M.** October 8, 1923. Sent by Messrs. Lowe & Shawyer, Jones, and Ladds (Swanley). First raised by Mr. Roots (**A.M.** 1910).

* **Golden Polly**, **A.M.** October 8, 1923. Sent by Messrs. Bath, Proctor (Chesterfield), and Godber. Sport from 'Polly.'

Miss B. Miller, **A.M.** October 8, 1923. Sent by Messrs. Dobbie.

Golden Diana, **H.C.** October 8, 1923. Sent by Messrs. Barr, Bath, Dobbie. Raised by Mr. Wells.

* **Mrs. R. C. Hamilton**, **H.C.** October 22, 1923. Sent by Messrs. Lowe & Shawyer, Jones, and Bath. Raised by Mr. J. W. Scott.

Leslie, **H.C.** October 8, 1923. Sent by Messrs. Dobbie, Bath, and Jones. Raised by Mr. Wells (**A.M.** 1914).

Carrie, **H.C.** October 8, 1923. Sent by Messrs. Barr and Bath. Raised by Mr. Goacher (**A.M.** 1914).

HORACE MARTIN (Bath, Jones), **A.M.**—Described vol. 40, p. 526. Flowering from October 7. This variety also came from Messrs. Dobbie under the names 'Elstob Yellow' and 'Maggie' (a misnomer).

GOLDEN DIANA (Barr, Bath, Dobbie), **H.C.**— $2\frac{1}{2}$ feet, compact, bushy. Flowers 3 inches, lemon-yellow; rays broad, flat, somewhat incurved. Flowering from September 28. A sport from 'Diana.'

LESLIE (Dobbie, Barr, Jones), **H.C.**—See vol. 40, p. 526. Colour similar to last. Flowering from September 24.

CARRIE (Barr, Bath), **H.C.**—See vol. 40, p. 526. Habit of last, but brighter yellow. Flowering from October 2.

MARTIN REED (Bath, Jones, Barr).— $3\frac{1}{2}$ feet, bushy. Flowers 3 inches, bright lemon-yellow; rays medium width, somewhat quilled and incurved. Flowering from October 10. Sport from 'Perle Châtillonnaise.'

J. BANNISTER (Jones, Godber, Bath).—See vol. 40, p. 525. Near last. Flowering from October 18. Raised by Mr. Wells.

CRANFORD YELLOW (Lowe & Shawyer, Jones).—See vol. 40, p. 526. Flowering from October 22. 'Mrs. M. Stewart' (Dobbie) was similar to this.

MRS. R. C. HAMILTON (Jones, Lowe & Shawyer), **H.C.**—Very vigorous, $3\frac{1}{2}$ feet, bushy. Flowers $3\frac{1}{2}$ inches, bright golden-yellow, rays broad, pointed, sometimes with coppery tinge on margin. Flowering from October 24. Best disbudded. Raised by Mr. Roots. 'Miss Ethel Harvey,' sent by Messrs. Bath, was this. The true plant of this name has incurved florets.

CRANFORDIA (Lowe & Shawyer).—See vol. 40, p. 526. Habit of last, but centre of flower deeper. Flowering from October 26. Raised by Mr. Roots.

GOLDEN CRANFORDIA (Godber).—Habit of last, but flowers of deeper shade. Flowering from October 30. Sport from 'Cranfordia.'

CHAMP D'OR (Barr, Bath).—See vol. 40, p. 526. Flowering from October 5. Raised by M. Nonin.

PHOEBE (Jones).— $2\frac{1}{2}$ feet, bushy. Flowers 3 to $3\frac{1}{2}$ inches, golden-yellow, deeper in middle; rays broad, inner incurved, outer reflexed. Flowering from October 4. Raised by Mr. Jones.

GOLDEN GLOW (Jones).—See vol. 40, p. 526. Fades to a pale tint. Flowering from October 3. An American variety.

MRS. A. THOMPSON (Bath).—See vol. 40, p. 527. A very compact flower. Flowering from October 13. Raised by Mr. Wells.

HOLLCOTT YELLOW (Lowe & Shawyer), **A.M.** (see also below).— $3\frac{1}{2}$ feet, vigorous and bushy. Flowers $3-3\frac{1}{2}$ inches, bright golden-yellow, very free; rays broad, slightly curled. Flowering from September 29. Raised by Mr. Roots.

'Goldfinder,' from Mr. Jones, and 'Philip' from Mr. Ladds, were similar to this.

* For synonyms, see notes.

GOLDEN POLLY (Bath, Proctor), **A.M.**—A bright golden-yellow sport from 'Polly,' q.v. Flowering from September 24. Raised by Mr. Wells. Sent also as 'Florrie Wilkinson,' by Mr. Godber, who also selected it.

ROBERT GARRETT (Jones).—Much like 'Golden Polly.' Flowering from September 29. Raised by Mr. Jones.

GUINEA GOLD (W. H. Simpson), **H.C.**— $3\frac{1}{2}$ feet, rather spreading. Flowers deep golden-yellow; rays broad, incurved. Flowering from September 24.

MISS B. MILLER (Dobbie), **A.M.**—See vol. 40, p. 527. Flowering from October 13.

ETOILE D'OR (Jones) —See vol. 40, p. 526. Flowering from October 30. Raised by M. Nonin.

Flowers orange-yellow.

Golden Almirante, **A.M.** October 22, 1923. Sent by Mr. Chatfield of Southwick, the raiser.

ORION (Dobbie).— $2\frac{1}{2}$ feet. Flowers 4 inches, deep golden-yellow with shading of bronze; rays broad, slightly curled and pointed. Flowering from September 29.

HARRY THORPE (Dobbie, Bath, Thorpe, Proctor), **H.C.**— $2\frac{1}{2}$ feet, bushy. Flowers $3\frac{1}{2}$ to 4 inches, golden-yellow with bronze shading, especially on reverse; rays narrow, quilled. Flowering from September 24.

GOLDEN ALMIRANTE (Chatfield), **A.M.**—A beautiful sport from 'Almirante,' which it resembles in all but having deep golden flowers faintly suffused bronze-carmine. Flowering from October 13.

'Vinstone Bronze,' from Mr. Webber, was indistinguishable from this.

Flowers terra-cotta.

Verona, **A.M.** October 8, 1923. Sent by Messrs. Jones, W. H. Simpson, Barr, Bath. Raised by Mr. Wells.

Wells' Scarlet, **A.M.** October 8, 1923. Sent by Messrs. Dobbie (**A.M. 1910**). Raised by Mr. Wells.

Phoenix, **A.M.** October 8, 1923. Raised and sent by Messrs. Scott & Wickham of Witley.

Polly, **A.M.** October 8, 1923. Sent by Messrs. Jones, Dobbie, Godber. Raised by Mr. Wells (**A.M. 1910**).

Ivan, **H.C.** October 22, 1923. Raised and sent by Mr. Jones.

Nina Blick, **H.C.** October 22, 1923. Sent by Messrs. Bath and Jones. Raised by Mr. Jones (**A.M. 1914**).

VERONA (Jones, W. H. Simpson, Barr, Bath), **A.M.**—3 feet, bushy. Flowers 3 inches, fiery terra-cotta with gold reverse; rays medium, flat. Flowering from September 17.

NINA BLICK (Bath, Jones), **H.C.**—See vol. 40, p. 529. Flowering from October 15.

MRS. A. W. THORPE (Thorpe).—3 feet. Flowers 3 inches, pale pinkish terra-cotta on gold. Flowering from October 22. Raised by Mrs. A. W. Thorpe.

DOLORES (Jones).— $3\frac{1}{2}$ feet. Flowers 3 inches, bright terra-cotta with gold reverse; rays medium width, flat. Flowering from October 20. Raised by Messrs. Lowe & Shawyer.

LE TAGE (Dobbie).—See vol. 40, p. 530. Flowering from October 15. Duller than either 'Mrs. A. W. Thorpe' or 'Minnie Carpenter.'

MINNIE CARPENTER (Dobbie).—See vol. 40, p. 529. Flowering from October 15.

IVAN (Jones), **H.C.**— $3\frac{1}{2}$ feet, bushy. Flowers 3 inches, pale terra-cotta, shaded gold; rays broad, incurved, rather curled. Sporting to crimson. Flowering from October 8.

BAZRA (Bath).— $2\frac{1}{2}$ feet, rather spreading. Flowers $2\frac{1}{2}$ to 3 inches, bright bronzy-orange with gold reverse; rays medium, flat. Flowering from October 8.

RADIANCE (Dobbie).—See vol. 40, p. 532. Flowers reddish-carmine on gold.

WELLS' SCARLET (Dobbie), **A.M.**— $2\frac{1}{2}$ feet, bushy. Flowers $3-3\frac{1}{2}$ inches, bronzy-scarlet, shaded terra-cotta with bronze-yellow reverse; rays broad, rather curled. Flowering from September 11.

PHOENIX (Scott & Wickham), **A.M.**— $3\frac{1}{2}$ feet, very vigorous, erect and bushy. Flowers 3 inches, bright terra-cotta with gold reverse; rays narrow, curled. Flowering from September 30.

AUTUMN BEAUTY (Bath).— $2\frac{1}{2}$ feet, bushy. Flowers $3\frac{1}{2}$ -4 inches, deep gold flushed bronze; rays broad rather quilled and pointed. Flowering from September 18.

POLLY (Jones, Dobbie, Godber), **A.M.**—See vol. 40, p. 529. Flowering from September 18. Raised by Mr. Wells. Apt to sport to both lighter and darker forms. Plants under this name from Messrs. Bath were nearer 'Cranford Yellow.'

GOLDFINCH (Jones, Bath, W. H. Simpson, Thorpe).—3½ feet, bushy. Flowers 3½–4 inches, pinkish-buff on a gold ground; rays narrow, rather quilled, outer reflexed, inner incurved. Flowering from October 1. Raised by Mr. Thorpe.

HOLLICOTT BRONZE (Lowe and Shawyer).—A sport from 'Hollicott Yellow.' Golden-yellow faintly tinged bronze, and often reverting to its parent. Flowering from October 2. Sent as 'Harvester' by Messrs. Jones, Bath, Dobbie, Godber, Barr, and as 'John McAlpine' by Messrs. Dobbie.

ORANGE (Bath).—2½ feet, bushy. Flowers 2½ inches, terra-cotta on a gold ground with golden-chestnut reverse; rays narrow, curled. Flowering from October 8.

Flowers blush.

***Silver Lining**, **A.M.** October 8. Sent by Messrs. Thorpe, Jones, Bath. Raised by Messrs. Thorpe.

PERLE CHATILLONAISE (Jones, Leak, Godber, Barr).—See vol. 40, p. 519. Flowering from October 8. Almost with the effect of pale yellow in the garden.

ENA THORPE (Thorpe, Bath).—Paler than 'Silver Lining,' and with some what smaller incurved flowers. Flowering from October 4. Raised by sender.

SILVER LINING (Thorpe, Jones, Bath), **A.M.**—3 feet, compact, bushy. Flowers 3½–4 inches, white flushed pale amaranth-pink with white reverse; rays broad, inner incurved, outer reflexed. Flowering from September 20.

Sent also by Messrs. Dobbie, Bath, and Jones under the erroneous name of 'Miss G. K. Thorpe.'

TOURNAINE (Dobbie).—Near 'Silver Lining' in colour and type, but dwarfer. Flowering from September 24.

JAMES BATEMAN (Bath).—See vol. 40, p. 522. Flowering from October 13. Raised by Mr. Goacher.

DOROTHY ASHLEY (Lowe & Shawyer, Jones, Bath, Barr, Godber).—See vol. 40, p. 520. Flowering from September 20. Raised by Mr. J. W. Scott.

BRONZE MISS BURCHFELL (Jones).—3½ feet, rather spreading. Flowers, 3½ inches, coral-pink on orange with pale gold reverse. Flowering from October 22. Raised by Mr. Jones.

DARLING (W. H. Simpson).—See vol. 40, p. 520. Flowering from October 20.

Flowers pink.

Pearl, **A.M.** October 8, 1923. Raised and sent by Mr. Jones.

Normandie, **A.M.** October 8, 1923. Sent by Messrs. Dobbie, Jones, and Bath. Raised by M. Nonin.

Freda, **A.M.** October 8, 1923. Raised and sent by Mr. Jones.

Bijou, **H.C.** October 8, 1923. Raised and sent by Mr. Jones.

Provence, **H.C.** October 8, 1923. Sent by Messrs. Barr and Bath. Raised by M. Nonin.

MIGNON (Bath, Jones).—See vol. 40, p. 523. Flowering from October 5. Raised by M. Nonin.

BETTY SPARK (Jones, Barr, Bath).—See vol. 40, p. 520. Flowering from October 13. Raised by Messrs. Lowe & Shawyer.

DOLLY REEVES (Dobbie).—Slightly dwarfer, but otherwise like last.

LILLIE (Dobbie).—2 feet. Flowers 3–3½ inches, pale amaranth-pink on white. Flowering from October 4.

CYNTHIA (Dobbie).—Slightly darker and taller than last. Flowering from October 8. Raised by Mr. Young.

PEARL (Jones), **A.M.**—1½ foot, very compact. Flowers 3–3½ inches, pale amaranth-pink. Flowering from September 22.

Bijou (Jones), **H.C.**—1½ foot, very compact. Flowers pale amaranth-pink, with rays of medium length and width, very compact. A dwarf bedding variety raised by Mr. Jones. Flowering from September 24.

NORMANDIE (Dobbie, Jones, Bath), **A.M.**—See vol. 40, p. 520. Flowering from October 1.

DELIGHT (Lowe & Shawyer).—3½ feet, compact. Flowers 3 inches, cream flushed pink; rays broad, slightly curled. Flowering from October 22. Raised by Mr. J. W. Scott.

'Pink Delight,' from Mr. Jones, was identical with this.

* For synonyms, see notes.

JEAN (Jones).—3½ feet. Flowers 3 inches, soft salmon-pink. Flowering from October 22. Raised by sender.

BETTY (Jones).—A little darker and less bright than last. Flowering from October 13. Raised by sender.

UXBRIDGE PINK (Godber).—3 feet. Flowers 3½ inches, bright pale amaranth-pink. Flowering from October 26.

MRS. MARSHALL FIELD (Barr, Jones).—2½ feet. Slightly smaller and deeper in shade than last. Flowering from October 26.

Sent also by Messrs. Barr and Bath under the erroneous name of 'Perle Rose.'

NELLIE HEMSTED (Barr).—Too much like last, and equally late.

DANIEL (Bath).—2½ feet. Flowers 3½ inches, light mallow-purple, compact; rays broad, flat. Flowering from September 11. Raised by M. Nonin.

ELSIE HEADY (Lowe & Shawyer, Barr, Bath).—3 feet. Flowers 3½ inches, bright rose-pink; rays broad, flat. Flowering from October 13. Raised by Mr. J. W. Scott. Sent by Messrs. Bath under the erroneous name 'Fée Parisienne.'

PINK PROFUSION (Jones, Barr, Bath, Godber).—3 feet, compact, bushy. Flowers 3½ inches; rays broad, flat, pale amaranth-pink. Flowering from October 26. Raised by Mr. J. W. Scott.

Sent also under the erroneous name of 'Pluie d'Argent' by Messrs. Bath.

FREDA (Jones), **A.M.**.—2½ feet. Flowers 3½ inches; flushed pale amaranth-pink; rays long, somewhat quilled, inner incurved. Flowering from September 11.

CRANFORD PINK (Jones).—See vol. 40, p. 520. Of stiff, erect habit. Flowering from October 30. Raised by Messrs. Lowe & Shawyer.

PROVENCE (Barr, Bath), **H.C.**.—See vol. 40, p. 521. Flowering from October 3.

ELENORE (Jones).—Too much like last, but without the tips of gold. Flowering from October 5. Raised by sender. Approaching 'Mme. Marie Massee' in type of flower.

Flowers mauve-pink.

Mme. Marie Massee, A.M. October 8, 1923. Sent by Messrs. Dobbie, Jones, Bath (**A.M.** 1914). Raised by M. Jean Delaux.

Claret, A.M. October 8, 1923. Sent by Messrs. Dobbie.

Eden, H.C. October 22, 1923. Sent by Messrs. Barr and Bath (**A.M.** 1910). Raised by M. Nonin.

Bouquet Rose, H.C. October 22, 1923. Sent by Mr. Jones (**A.M.** 1910). Raised by M. Nonin.

O. J. QUINTUS (Jones).—See vol. 40, p. 523. Flowering from October 30.

FLEUR DE PÊCHER (Bath).—3½ feet. Flowers amaranth-pink; rays narrow, flat, inner incurved. Flowering from October 22. Raised by M. Nonin.

ANTHEA (Dobbie, Barr).—3 feet. Flowers 3½ inches, bright amaranth-pink; rays broad, flat. Flowering from October 20.

MISS BURCHFELL (Jones).—See vol. 40, p. 523. Flowering from October 22. Raised by Mr. Wells.

LA YONNE (Dobbie).—See vol. 40, p. 522. Flowering from October 13.

LA SOMME (Jones).—See vol. 40, p. 522. Flowering from October 20.

FÉE PARISIENNE (Dobbie, Jones).—See vol. 40, p. 522. Much brighter than 'Fleur de Pêcher.' Flowering from October 13. Raised by M. Nonin.

MME. MARIE MASSE (Dobbie, Jones, Bath), **A.M.**.—See vol. 40, p. 523. Flowering from October 8.

IMPROVED MASSE (Dobbie).—See vol. 40, p. 524. Dwarfer with larger, more lilac flowers, and earlier than last. Flowering from September 9.

EDEN (Barr, Bath), **H.C.**.—See vol. 40, p. 521. Flowering from October 13.

JEANNINE VIAUD (Jones, Bath).—3 feet. Flowers 3–3½ inches, bright mallow-purple, but becoming dull. Flowering from October 22. Raised by M. Nonin.

BOUQUET ROSE (Jones), **H.C.**.—See vol. 40, p. 521. Of stiff, erect habit, darker and brighter than last. Flowering from October 20.

HECTOR (Bath, Dobbie).—See vol. 40, p. 522. Flowering from October 8.

LICHFIELD PINK (Dobbie, Jones, Bath, Thorpe, W. H. Simpson).—Darker than 'Hector.' Flowering from October 13. Raised by Mr. Thorpe.

RUFFISQUE (Jones).—3 feet. Flowers 3½–4 inches, deep rose-pink on cream; rays narrow, flat, rather pointed. Flowering from October 22.

CLARET (Dobbie), **A.M.**.—2½ feet. Flowers 3½ inches, rosolane-purple on white, fading; rays rather curled. Flowering from September 22.

Flowers purple.

Jamie, A.M. October 8, 1923. Sent by Messrs. Bath. Raised by Mr. Goacher.

Lichfield Purple, A.M. October 22, 1923. Sent by Messrs. Jones, Dobbie, Thorpe, Simpson. Raised by Mr. Thorpe.

Rubis, H.C. October 22, 1923. Sent by Messrs. Barr.

R. Pemberton, H.C. October 8, 1923. Sent by Messrs. Barr and Jones.

RUBIS (Barr), **H.C.**—3 feet. Flowers $3\frac{1}{2}$ inches, deep rhodamine-purple, reverse whitish; rays of medium width, pointed, inner incurved. Flowering from October 13.

L'AISNE (Jones).—See vol. 40, p. 524. Flowering from October 13. Raised by M. Nonin.

R. PEMBERTON (Barr, Jones), **H.C.**—See vol. 40, p. 525. Flowering from October 13. Messrs. Barr's stock came under the erroneous name of 'Rubis.'

FREEDOM (Barr).—See vol. 40, p. 524. Flowering from October 20.

JAMIE (Barr), **A.M.**—3 feet. Flowers $3\frac{1}{2}$ –4 inches, bright crimson-purple, reverse whitish; rays broad, inner incurved, outer reflexed. Flowering from October 5.

LICHFIELD PURPLE (Jones, Dobbie, Thorpe, Bath, W. H. Simpson), **A.M.**— $3\frac{1}{2}$ feet. Flowers 4 inches, rich purple, reverse whitish, outer florets reflexed, inner incurved. Flowering from October 8.

BATOU (Bath).— $3\frac{1}{2}$ feet, very compact. Flowers $2\frac{1}{2}$ inches, deep amaranth-purple; rays medium, flat. Flowering from October 20.

Flowers bronze.

* **Hollcott Beauty, A.M.** October 8, 1923. Sent by Messrs. Lowe & Shawyer. Raised by Mr. Roots (A.M. 1920).

* **Bronze Goacher, A.M.** October 22, 1923. Sent by Messrs. Jones, Dobbie, Bath, Barr. Raised by Mr. Wells (A.M. 1911).

Mrs. Jack Pearson, A.M. October 8, 1923. Raised and sent by Mr. Ladds.

Golden Goacher, H.C. October 8, 1923. Sent by Messrs. Dobbie, Bath, Jones, W. H. Simpson.

Bronze Provence, H.C. October 8, 1923. Raised and sent by Mr. Jones.

No. 1 Bronze, H.C. October 22. Sent by Messrs. Lowe & Shawyer. Raised by Mr. Roots.

RYECROFT GLORY (Jones).—See vol. 40, p. 527. Flowering from October 26.

GOLDEN GOACHER (Dobbie, Bath, Jones, W. H. Simpson), **H.C.**—A pale form of 'Bronze Goacher.' Flowering from October 5. Apt to sport to 'Goacher's Crimson.'

DOROTHY BARRATT (Jones).—Somewhat paler and brighter than next. Flowering from October 8. Raised by sender.

BRONZE CHÂTILLONNAISE (Barr).— $3\frac{1}{2}$ feet. A shade paler than 'Hollcott Beauty.' Flowering from October 8.

NELLIE THORPE (Thorpe, Dobbie, W. H. Simpson, Bath).— $2\frac{1}{2}$ feet, rather spreading. Flowers 3 inches, pale amber-bronze with pink suffusion; rays flat. Flowering from October 8. Raised by Mr. Thorpe.

HOLLICOTT BEAUTY (Lowe & Shawyer), **A.M.**—3 feet, bushy. Flowers $3\frac{1}{2}$ inches, bright golden-bronze, with old gold reverse; rays broad, curled, incurved, outer reflexed. Flowering from October 5. Raised by Mr. Roots.

'Shirley Conquest' sent by Mr. W. H. Simpson and 'September Glory' sent by Messrs. Jones and Bath were identical with this.

TONKIN (Bath).—See vol. 40, p. 529. Flowering from October 22.

BRONZE GOACHER (Jones, Dobbie, Bath, Barr), **A.M.**—See vol. 40, p. 530. Flowering from October 8. Fades from chestnut-bronze with age.

'Mrs. J. Fielding,' sent by Messrs. Barr, was identical with this and wrongly named.

No. 3 BRONZE (Lowe & Shawyer).—4 feet, very vigorous and bushy. Flowers $3\frac{1}{2}$ inches, deep golden-yellow with chestnut-bronze shading; rays medium, rather pointed. Flowering from October 20. Raised by Mr. Roots.

'October Glory,' sent by Mr. Jones, was identical with this.

MISS BEATRICE WEBBER (Webber).—3 feet. Flowers $2\frac{1}{2}$ inches, bronzy golden-yellow. Flowering from October 15; a bronze sport from 'Almirante.'

HARRIE (Bath).—See vol. 40, p. 527. The colour fades with age. Flowering from October 8.

DIANA (Dobbie).—See vol. 40, p. 528. Flowering from October 8.

* For synonyms, see notes.

BRONZE DELIGHT (Jones).—A pale bronze form of 'Pink Delight,' q.v. Flowering from October 22.

NAOMI (Jones).—2½ feet, bushy. Flowers 3½ inches, pale golden-yellow shaded buff; rays medium, reflexed. Flowering from September 20. Raised by sender.

ALEX. COYLE (Thorpe).—Rather darker than 'Naomi.' Flowering from October 22. Raised by sender.

BRONZE PROFUSION (Jones, Bath).—A brighter and darker flower than last. Flowering from October 20.

BRONZE BETTY SPARK (Jones).—A paler form, but somewhat similar to 'Bronze Provence.' Flowering from October 8.

AGNES (Bath).—Paler but somewhat similar to 'Bronze Provence.' Flowering from October 8. Raised by Mr. Goacher.

BRONZE PROVENCE (Jones), **H.C.**.—A bright bronze sport from 'Provence,' q.v. Flowering from October 3.

NANCY (Jones).—3½ feet, bushy. Flowers 3 inches, good bronze with faint pink suffusion and gold reverse. Flowering from October 5. Raised by sender.

FRANCIS (Bath).—2 feet. Flowers somewhat darker than 'Nancy.' Flowering from October 8.

MRS. JACK PEARSON (Ladds), **A.M.**.—3½ feet, bushy. Flowers 3½–4 inches, amber with terra-cotta flush; rays broad, flat. Flowering from September 18. Remarkable for its successive production of good flowers.

BRONZE NORMANDIE (Jones, Godber, W. H. Simpson, Bath, Barr).—A bronze terra-cotta sport from 'Pink Normandie,' with flowers shaded fawn. Flowering from October 8. Flowers with rather less red than in 'Bronze Provence.'

ENCHANTRESS (Jones).—3 feet. Near 'No. 1 Bronze' in colouring, but less deep. Flowering from October 10.

MRS. A. BEECH (Dobbie).—A brighter shade than 'No. 1 Bronze.' See vol. 40, p. 527. Flowering from October 22.

No. 1 BRONZE (Lowe & Shawyer), **H.C.**.—Darker than last. Flowering from October 20. Raised by Mr. Roots.

Flowers rose-crimson.

Badia Ferrer, A.M. October 8, 1923. Sent by Messrs. Bath. Raised by M. Nonin.

MISS EVELYN ARKWRIGHT (Hyde).—2½ feet, bushy. Flowers 3 inches, old rose shaded salmon; rays broad, flat, incurved except outer, which reflex. Flowering from October 8.

BADIA FERRER (Bath), **A.M.**.—Rather darker and larger than 'Miss Evelyn Arkwright.' Flowering from September 22.

MRS. J. MASON (Bath).—2½ feet. A bright old rose sport from 'Mme. Marie Masse.' Flowering from September 12. Raised by Mr. Smellie.

CHERRY (Dobbie).—See vol. 40, p. 533. Flowering from October 13.

CHAMPAGNE (Jones).—See vol. 40, p. 533. Flowering from October 27.

ELIZABETH GILLELAND (Dobbie, Jones, Bath, W. H. Simpson).—3½ feet. Flowers cerise-carmine on gold; rays gold-tipped. Flowering from October 10. Raised by Mr. Thorpe.

CRIMSON NELLIE THORPE (Thorpe).—A sport from 'Nellie Thorpe,' with flowers old rose shaded crimson. Flowering from October 5. Raised by sender.

LA GARONNE (Jones, Bath, Barr, W. H. Simpson).—2½ feet, bushy. Flowers 3 inches, old rose shaded salmon, with whitish reverse; rays broad, rather curled, inner incurved. Flowering from October 10. Raised by M. Nonin.

Flowers chestnut.

Ernest Baltet, A.M. October 22, 1923. Sent by Messrs. Dobbie, Bath, Jones. Raised by M. Delaux.

* **Crimson Polly, A.M.** October 8, 1923. Sent by Messrs. Jones, Bath, Dobbie, Simpson. Raised by Mr. Wells (**A.M. 1912**).

Crimson Marie Masse, A.M. October 8, 1923. Sent by Messrs. Jones, Bath, and Proctor.

Mrs. J. Fielding, A.M. October 8, 1923. Sent by Messrs. Bath and Dobbie. Raised by Mr. Fielding (**A.M. 1914**).

Almirante, A.M. October 22, 1923. Sent by Messrs. Lowe & Shawyer, Jones, Dobbie, Barr, and Bath. Raised by Mr. Scott (**A.M. 1914**).

President Meagy, H.C. October 22, 1923. Sent by Messrs. Bath and Jones. Raised by M. Nonin.

* For synonyms, see notes.

ERNEST BALLET (Dobbie, Bath, Jones), **A.M.**— $3\frac{1}{2}$ feet, erect. Flowers $3\frac{1}{2}$ inches, chestnut with old rose shading; rays broad, flat. Flowering from October 13.

PRESIDENT MEAGY (Bath, Jones), **H.C.**—3 feet, bushy. Flowers $3\frac{1}{2}$ inches, chestnut on gold. Flowering from October 15.

CRIMSON POLLY (Jones, Bath, Dobbie, W. H. Simpson), **A.M.**— $2\frac{1}{2}$ feet, bushy and compact. Flowers bright chestnut-scarlet on gold, with gold reverse; rays broad, flat, incurved. Flowering from September 15.

'Abercorn Beauty' from Messrs. Dobbie, raised by Mr. Brown, was indistinguishable from this.

LE PACTOLE (Barr, Jones, Dobbie).—See vol. 40, p. 530. Flowering from October 20.

CRIMSON MARIE MASSE (Jones, Bath, Proctor), **A.M.**—See vol. 40, p. 531. Flowering from September 11.

MRS. J. FIELDING (Bath, Dobbie), **A.M.**—A more golden sport from 'Goacher's Crimson.' See vol. 40, p. 531. Flowering from September 17.

ALMIRANTE (Lowe & Shawyer, Jones, Dobbie, Barr, Bath), **A.M.**—See vol. 40, p. 531. Flowering from October 20. A finely shaped flower on a plant of excellent habit.

ARMOREL (Barr, Dobbie).— $3\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ –4 inches, dull carmine-scarlet on gold, with old gold reverse. Flowering from October 20.

CRIMSON DIANA (Dobbie).—3 feet. Flowers $3\frac{1}{2}$ inches, brownish crimson on yellow, with tips of rays bright yellow and bronze reverse. Flowering from September 20.

Flowers chestnut crimson.

Firefly, A.M. October 8, 1923. Sent by Messrs. Simpson and Barr. Raised by Mr. Jones.

Ethel Blades, A.M. October 22, 1923. Sent by Mr. Jones. Raised by Mr. Wells.

* **Alcade, A.M.** October 22, 1923. Raised and sent by Messrs. Lowe & Shawyer.

Red Cross, H.C. October 22, 1923. Sent by Messrs. Bath. Raised by Mr. Harding.

L'Argenteuillaise, H.C. October 22, 1923. Sent by Messrs. Barr and Jones. Raised by M. Nonin.

Fleuve Rouge, H.C. October 22, 1923. Sent by Messrs. Dobbie.

NANTWICH ARISTOCRAT (Bath).—3 feet. Flowers $3\frac{1}{2}$ inches, dull carmine-scarlet on gold with gold reverse. Flowering from October 20. Raised by Mr. Harding.

L'Argenteuillaise (Barr, Jones), **H.C.**—See vol. 40, p. 531. Flowering from October 20.

ALCADE (Lowe & Shawyer), **A.M.**—A bright carmine-scarlet sport from 'Almirante.' Flowering from October 20.

'Red Almirante,' sent by Mr. Jones, was indistinguishable from this.

MADAME DROUARD (Bath, Barr).—See vol. 40, p. 532. Flowering from October 10. Raised by M. Nonin.

RED CROSS (Bath), **H.C.**—Best described as a much darker 'Crimson Polly,' with less incurved rays. Flowering from September 28.

FLEUVE ROUGE (Dobbie), **H.C.**— $3\frac{1}{2}$ feet, bushy. Flowers bright chestnut-scarlet on gold, with gold shaded chestnut reverse; rays broad and rather incurved. Flowering from October 4.

FIREFLY (W. H. Simpson, Barr), **A.M.**—Much like last, but inner rays not incurved. Flowering from October 5.

H. H. CRANE (Bath).—Rather taller and with rays more curled than in 'Firefly.' Flowering from October 8. Raised by Mr. Goacher.

ETHEL BLADES (Jones), **A.M.**—See vol. 40, p. 531. Flowering from October 13.

MAXIM (Barr).—Somewhat darker than last. Flowering from October 13.

Flowers crimson.

Goacher's Crimson, A.M. October 8, 1923. Sent by Messrs. Dobbie, Barr, Jones, Bath, Proctor. Raised by Mr. Goacher (**A.M. 1914**).

Dick Barnes, A.M. October 8, 1923. Sent by Messrs. Dobbie, Bath, Jones, Thorpe, W. H. Simpson, Proctor. Raised by Mr. Thorpe (**A.M. 1914**).

Jeannie, A.M. October 22, 1923. Raised and sent by Mr. Priestner of Baguley.

Mrs. W. Sydenham, A.M. October 8, 1923. Sent by Messrs. W. H. Simpson and Dobbie (**A.M. 1914**).

* For synonyms, see notes.

ROI DES PRECOCES (Barr).—See vol. 40, p. 533. Flowering from October 26.
GOACHER'S CRIMSON (Dobbie, Barr, Jones, Bath, Proctor), **A.M.**—See vol. 40, p. 532. Flowering from October 3.

PARISIENNE (Barr).—3½ feet. Flowers 3 inches, dull crimson-scarlet on gold, with gold reverse; rays rather pointed and curled. Flowering from October 26.

DICK BARNES (Dobbie, Bath, Jones, Thorpe, W. H. Simpson, Proctor), **A.M.**—3 feet, compact, bushy. Flowers 3–3½ inches, rich burgundy-crimson, with whitish reverse; rays medium, curled. Flowering from September 20.

MRS. W. SYDENHAM (W. H. Simpson, Dobbie), **H.C.**—A shade darker than 'Dick Barnes.' See vol. 40, p. 532. Flowering from September 11.

JEANNIE (Priestner), **A.M.**—3 feet, very stiff and erect. Flowers 3½ inches, carmine, with gold-tinted reverse; rays broad, slightly curled. Flowering from October 20.

POMPON VARIETIES.

Flowers white.

WHITE ST. CROUET'S (Dobbie).—2½ feet. Flowers 1½ inch, white, with faint pink tinge on reverse. Flowering from October 5.

ST. CROUET'S (Dobbie).—Very similar to last, but without pink.

Flowers blush.

Mr. Selly, H.C. Sent by Messrs. Dobbie (**A.M. 1910**).

GENTILLESSE (Dobbie).—1½ foot. Flowers 1¾ inch, cream, with amaranth-pink suffusion. Flowering from October 4.

EARLY BLUSH (Dobbie).—1½ foot. Flowers 1½ inch, white suffused amaranth-pink. Flowering from October 10.

MR. SELLY (Dobbie), **H.C.**—1¼ foot. Flowers mallow-pink. Flowering from September 11.

J. B. DUROIS (Dobbie).—1¾ foot. Flowers 2½ inches, pale amparo-pink on white. Flowering from September 18.

Flowers pink.

MRS. E. STACEY (Dobbie).—1½ foot. Flowers 1½–2½ inches, deep cream, flushed apricot. Flowering from September 22.

Flowers yellow.

Flora, **A.M.** October 8, 1923. Sent by Messrs. Dobbie and Barr (**A.M. 1910**).

Gladys Gray, H.C. October 22, 1923. Sent by Messrs. Barr.

Craigmillar, H.C. October 22, 1923. Sent by Messrs. Dobbie. Raised by Mr. Grieve.

Mignon, H.C. October 8, 1923. Sent by Messrs. Dobbie.

Piercy's Seedling, H.C. October 8, 1923. Sent by Messrs. Dobbie.

GLADYS GRAY (Barr), **H.C.**—2½ feet. Flowers 1½–2 inches, very compact, lemon-yellow. Flowering from October 6.

FLORA (Dobbie, Barr), **A.M.**—2½ feet. Flowers 2 inches, bright yellow. Flowering from September 20.

CRAIGMILLAR (Dobbie), **H.C.**—2 feet, very compact and bushy. Flowers 2–2½ inches, golden-yellow. Flowering from October 6.

MIGNON (Dobbie), **H.C.**—Dwarfer than last and very bushy. Flowers 1½ inch, golden-yellow. Flowering from September 28.

PIERCY'S SEEDLING (Dobbie), **H.C.**—1½ foot. Flowers 2½ inches, buff on citron-yellow, very compact and somewhat incurved. Flowering from September 20.

Flowers terra-cotta.

Orange Pet, A.M. October 8, 1923. Sent by Messrs. Barr and Bath. Raised by Mr. Goacher.

ORANGE PET (Barr, Bath), **A.M.**—2½ feet. Flowers 2–2½ inches, deep golden-yellow, with terra-cotta shading. Flowering from September 28.

EARLY-FLOWERING CHRYSANTHEMUMS AT WISLEY, 1923. III

Flowers of chestnut shades.

Little Bob, A.M. October 8, 1923. Sent by Messrs. Dobbie and Barr.

BRONZE BLUSHING BRIDE (Dobbie).— $2\frac{1}{2}$ feet. Flowers $2\frac{1}{2}$ inches, mallow-purple on bronze. Flowering from September 26.

TOREADOR (Dobbie).— $2\frac{1}{2}$ feet. Flowers $2-2\frac{1}{2}$ inches, chestnut-crimson, margined gold. Flowering from September 28.

LITTLE BOB (Dobbie).—2 feet. Flowers $1\frac{1}{2}$ inch, chestnut-crimson. Flowering from September 11.

Flowers crimson.

FRED PELE (Dobbie).— $2\frac{1}{2}$ feet. Flowers $1\frac{1}{2}$ inch, crimson-carmine. Flowering from October 6.

SINGLE VARIETIES.

Flowers white.

Taplow White, A.M. October 8, 1923. Sent by Messrs. Barr.

SIMPLICITY (Dobbie).— $3\frac{1}{2}$ feet, bushy. Flowers cream in bud, white when open, apt to be tinged pink, rays broad in 4 or 6 whorls. Flowering from September 28.

WHITE CITY (Dobbie).—Described vol. 40, p. 534. Flowering from September 26.

FLORENCE GILHAM (Dobbie).—Described vol. 40, p. 534. Flowering from September 28.

MRS. H. WOOLMAN (W. H. Simpson).—Flowers white, sometimes tinged pink, $2-2\frac{1}{2}$ inches, disc $\frac{1}{2}$ inch. Flowering from October 5.

TAPLOW WHITE (Barr), **A.M.**— $2\frac{1}{2}$ feet, compact, bushy. Flowers 3 inches, disc $\frac{1}{2}$ inch; rays broad with reflexed tips. Later tinged pink. Flowering from September 26.

ALPHA (Barr).—Less compact and with smaller flowers and narrower ray than last. Flowering from October 20.

CHASTITY (Jones).—Not a pure white. Flowering from October 25.

Flowers pale yellow.

Canary, H.C. October 8, 1923. Raised and sent by Mr. Jones.

CANARY (Jones), **H.C.**.— $3\frac{1}{2}$ feet, compact, bushy. Flowers $3\frac{1}{2}$ inches, fairly compact, rays narrow, pale golden-yellow. Disc $\frac{1}{2}$ inch. Flowering from September 26.

BRIGHTNESS (Barr).—Described vol. 40, p. 540. Flowering from September 28. Flowers fade quickly.

YELLOW GEM (Jones).—Near last in colour, but flowers very loose. Flowering from September 28. Raised by sender.

Flowers yellow.

Golden Firebrand, A.M. October 8, 1923. Sent by Messrs. Barr.

SUNSTONE (Barr).— $2\frac{1}{2}$ feet, bushy. Flowers $3-3\frac{1}{2}$ inches, strontium-yellow, disc $\frac{1}{2}$ inch; rays broad, flat in 6-8 rows. Flowering from September 11.

ADA NICE (Dobbie).—Dwarfier and with smaller, slightly darker, flowers than last. Flowering from September 11.

JOAN CARTER (Dobbie).—Rather straggling. See vol. 40, p. 540. Flowering from September 24. Raised by Mr. Wells.

SUPREME (W. H. Simpson).—Flowers somewhat ragged, bright golden-yellow. Flowering from October 3.

GOLDEN FIREBRAND (Barr).—**A.M.**.—A sport from 'Firebrand,' semi-double, but with too little substance; bright golden-yellow. Very early, flowering from September 1.

GOLDEN ORIOLE (W. H. Simpson).—3 feet. Flowers $2\frac{1}{2}$ inches, strontium-yellow, cup-shaped; rays incurved. Flowering from September 28.

Flowers mauve-pink.

J. Woolman, A.M. October 8, 1923. Sent by Messrs. Dobbie.
Rose Perfection, H.C. October 8, 1923. Raised and sent by Messrs. Jones.
Mizpah, H.C. October 8, 1923. Raised and sent by Messrs. Jones.
Fairy, H.C. October 22, 1923. Raised and sent by Messrs. Jones.
Rosamund Hall, H.C. October 22, 1923. Sent by Mr. W. H. Simpson.
Rosea, H.C. October 22, 1923. Raised and sent by Mr. Jones.

NIOBE (Thorpe).—Flowers $2\frac{1}{2}$ inches, deep cream faintly flushed carmine at tips, fades quickly. Flowering from September 20. Raised by sender.

FAIRY (Jones).—Flower $3-3\frac{1}{2}$ inches, faintly flushed amaranth-pink on white with white reverse; rays broad, rather loose; disc $\frac{1}{8}$ inch. Flowering from September 26.

BRAZIER'S BEAUTY (Dobbie).—Flowers $2-2\frac{1}{2}$ inches, white with amaranth-pink flush; disc $\frac{1}{8}$ inch. Plant very dwarf. Flowering from September 24.

The plant under this name from Messrs. Barr was double and in other ways distinct.

LACEWING (Jones).—3 feet. Flowers $3-3\frac{1}{2}$ inches, hermosa-pink, fading to white; rays narrow, rather loose, curled and quilled. Flowering from September 28. Raised by sender.

DOLLY THORPE (Thorpe).— $2\frac{1}{2}$ feet. Flowers 3 inches, salmon shaded terra-cotta; rays narrow, rather loose; disc $\frac{1}{8}$ inch. Flowering from September 20. Raised by sender.

GLADYS THORPE (Thorpe).— $2\frac{1}{2}$ feet. Flowers salmon on picric-yellow ground; fades with age. Flowering from September 18. Raised by sender.

PINK GEM (Dobbie).—See vol. 40, p. 175. Flowering from September 11.

ROSAMUND HALL (W. H. Simpson), **H.C.**.— $2\frac{1}{2}$ feet. Flowers $2\frac{1}{2}$ inches, light mallow-purple; rays broad. Flowering from October 13.

FORMIDABLE (W. H. Simpson).—See vol. 40, p. 536. Flowering from September 30.

J. WOOLMAN (Dobbie).— $2\frac{1}{2}$ feet. Flowers 3 inches, light phlox-purple on white, disc $\frac{1}{8}$ inch. Flowering from September 18.

GOOD HOPE (Barr).—3 feet. Flowers $2\frac{1}{2}$ inches, phlox-purple on white; rays medium width, flat; disc $\frac{1}{8}$ inch. Flowering from October 22.

MIZPAH (Jones), **H.C.**.—3 feet. Flowers 3 inches, phlox-purple on white; rays medium, flat; disc $\frac{1}{8}$ inch. Flowering from September 18.

ROSE PERFECTION (Jones), **H.C.**.—2 feet. Flowers $2\frac{1}{2}-3$ inches, rosolane-purple on white, fading with age; disc $\frac{1}{8}$ inch. Flowering from September 24. Raised by sender.

RICHARD (Dobbie).—Very similar in flower to last, but only $1\frac{1}{2}$ foot in height, and flowering from August 30.

CURLEW (W. H. Simpson).—Similar in colour to last, but $2\frac{1}{2}$ feet in height and with flowers $3-3\frac{1}{2}$ inches in diameter. Flowering from September 11.

SURREY (W. H. Simpson).—See vol. 40, p. 535. Flowering from October 5.

NATHALIE (W. H. Simpson, Thorpe).— $2\frac{1}{2}$ feet. Flowers 3 inches, old rose on yellow; disc $\frac{1}{8}$ inch. Flowering from September 30. Raised by Mr. Thorpe.

ROSEA (Jones), **H.C.**.— $3\frac{1}{2}$ feet. Flowers bright deep rose, with whitish tips; disc $\frac{1}{8}$ inch. Flowering from October 5. Raised by Mr. Jones.

Flowers rose-crimson.

ALICE (Jones).—Pomegranate-purple on yellow, rays in two rows. Flowering from October 26.

YVETTE RICHARDSON (Jones).—Crimson shaded old rose. Flowering from October 10.

SAPPHIRE (Jones).—Darker than 'Nathalie.' Flowering from September 18. Raised by Mr. Jones.

Flowers purple.

Merstham Glory, H.C. October 8, 1923. Sent by Messrs. Barr and Dobbie.

MERSTHAM GLORY (Barr, Dobbie), **H.C.**.— $2\frac{1}{2}$ feet, compact. Flowers 3 inches, purplish-crimson; rays broad, flat; disc $\frac{1}{8}$ inch. Flowering from September 28.

WALDRON GEM (Jones).— $2\frac{1}{2}$ feet. Flowers 2 inches, amaranth-purple, with white base to rays; disc $\frac{1}{8}$ inch. Flowering from October 22.

Flowers buff-red.

CANADA (Dobbie, Barr).—See vol. 40, p. 539. Fades quickly. Flowering from September 22.

Flowers terra-cotta.

Sunstar, A.M. October 8, 1923. Sent by Mr. W. H. Simpson.
Midnight Sun, A.M. October 8, 1923. Raised by Mr. Thorpe and sent by Messrs. W. H. Simpson, Thorpe, and Barr.
Shrapnel, H.C. October 22, 1923. Raised by Messrs. Thorpe and sent by Messrs. W. H. Simpson, Thorpe, and Barr.

SUNSTAR (W. H. Simpson), **A.M.**— $2\frac{1}{2}$ feet, bushy. Flowers 3- $3\frac{1}{2}$ inches, bright orange-terra-cotta, with bronze shading and reverse; disc $\frac{1}{4}$ inch. Flowering from September 20.

AUTUMN GLORY (Barr).—Near last, but fades very much. Flowering from September 11.

ELPHIN (Jones).—Terra-cotta shaded buff on gold ground, but fading very much. Flowering from October 5. Raised by sender.

SAIMONEA (W. H. Simpson).—Terra-cotta suffused salmon. Flowering from October 4.

MIDNIGHT SUN (W. H. Simpson, Thorpe, Barr), **A.M.**— $2\frac{1}{2}$ feet, compact. Flowers 3- $3\frac{1}{2}$ inches, dull scarlet on yellow; rays medium, flat; disc $\frac{1}{4}$ inch. Flowering from September 20. Raised by sender.

PARAPAN (Dobbie).—Salmon-terra-cotta. Flowering from September 15. Dwarf.

SUSIE (Dobbie).—Salmon shaded terra-cotta. Taller than last. Flowering from September 15.

WELLS' PRIDE (Dobbie, Barr).—Orange-terra-cotta on gold. Flowering from September 26.

F. WILSON (W. H. Simpson).—Pale salmon-terra-cotta with yellow band round disc. Flowering from September 12.

SHRAPNEL (W. H. Simpson, Thorpe, Dobbie), **H.C.**— $2\frac{1}{2}$ feet; rather spreading. Flowers 3 inches, rich terra-cotta shaded orange; rays broad, curled; disc $\frac{1}{4}$ inch. Flowering from October 8. Raised by Mr. Thorpe.

MRS. JOHN NEWTON (Jones).—Bright terra-cotta. Flowering from October 13. Raised by sender.

Flowers bronze.

AMBER QUEEN (Jones).— $2\frac{1}{2}$ feet, bushy. Flowers 3- $3\frac{1}{2}$ inches, terra-cotta shaded amber on yellow; rays broad, disc $\frac{1}{4}$ inch. Flowering from September 11. Raised by sender.

AMBER GLOW (Thorpe).—Flowers 3 inches, deep yellow with terra-cotta flush; rays broad, reflexed at tips. Flowering from September 24. Raised by sender.

WOPSIE (Dobbie).—Somewhat like last, but disc rather larger. Flowering from September 29.

EARLY MARY RICHARDSON (W. H. Simpson).—Flowers rather smaller and bright terra-cotta on gold, fading with age. Flowering from October 22.

Flowers chestnut-crimson.

Firebrand, A.M. October 8, 1923. Sent by Messrs. Barr.
Chieftain, A.M. October 8, 1923. Raised and sent by Messrs. Thorpe.
Ruby, A.M. October 8, 1923. Sent by Messrs. Dobbie.
Mrs. S. Smith, A.M. October 8, 1923. Sent by Messrs. Proctor.
Glorious, A.M. October 8, 1923. Sent by Messrs. W. H. Simpson.
Garnet, A.M. October 8, 1923. Raised and sent by Mr. H. J. Jones.

FIREBRAND (Barr), **A.M.**—See vol. 40, p. 537. A very good flower for cutting. Flowering from September 11.

CHIEFTAIN (Thorpe), **A.M.**— $3\frac{1}{2}$ feet. Flowers $3\frac{1}{2}$ inches, cup-shaped, chestnut-crimson; rays broad, flat, rather loose; disc $\frac{1}{4}$ inch. Flowering from September 20.

CRIMSON KING (Jones).—Flowers with narrow band of yellow round disc, fades very much. Flowering from September 26. Raised by sender.

RUBY (Dobbie), **A.M.**—See vol. 40, p. 537. Flowers smaller and darker than 'Chieftain' with narrower rays. Flowering from September 17.

MRS. S. SMITH (Proctor), **A.M.**—Flowers 3 inches, bright chestnut-crimson, reverse tinged bronze; rays broad, flat; disc $\frac{1}{4}$ inch. Flowering from September 11.

GLORIOUS (W. H. Simpson), **A.M.**—Flowers 3- $3\frac{1}{2}$ inches, dark chestnut-crimson with narrow yellow ring round the $\frac{1}{4}$ -inch disc, reverse tinged bronze; rays broad. Flowering from September 17.

GARNET (Jones), **A.M.**—Flowers smaller and somewhat darker than last, and without the ring; rays narrower. Flowering from September 20.

Flowers crimson.

REDWING (Jones).—3½ feet. Flowers 3 inches, carmine-red, paler at base of rays; disc ⅔ inch. Flowering from October 24. Raised by sender.

MRS. C. CURTIS (Jones).—3 feet. Flowers 3–3½ inches, crimson on gold, with gold shaded reverse; rays broad, flat, disc ⅔ inch. Flowering from October 13. Raised by sender.

VARIETIES TOO LATE TO FLOWER WELL.

ELSENHAM WHITE (Jones).

JULIET (Jones).

ELDRACO (Jones)

RED EMPEROR (Jones)

GOODWILL (Jones).

LE DANUBE (Jones)

DOROTHY HUMPHREY (Jones)

RUNNER BEANS AT WISLEY, 1923.

FORTY-TWO stocks of Runner Beans were grown in the garden in 1923. The season was a difficult one in many ways, and Runner Beans did not do well in many districts, but at Wisley, after a check imposed by the cold nights of the early part of the season, they grew finely and eventually fruited freely.

In the report of the Runner Bean trial of 1918 (*see this JOURNAL, 44*, p. 95) an attempt was made to group together the strains of Runner Beans that were most nearly alike, and the same grouping has been followed below.

In common with many other garden vegetables, stocks of Runner Beans have become mixed or have otherwise deteriorated during the war; and, as the practice of the Judging Committee is to ignore all that contain an appreciable number of rogues or poor types, many varieties, otherwise good for some garden purpose, do not receive recognition. It is clear that seed growers need to "clean up" their stocks of seed, using the most modern methods, otherwise the state of mixture now evident will become worse, and excellent varieties will be lost. It is obviously undesirable to use ground and labour for the growing of mixtures of good and inferior types. The latter can and should be eliminated.

The Committee selected the following for awards on account of their excellence for garden use, productiveness, and freedom from rogues.

- 18. **Bounteous, A.M.** August 27, 1923. Raised and sent by Messrs. Dickson & Robinson of Manchester.
- 28. **Prizewinner, A.M.** August 27, 1923. Raised by Messrs. Sutton and sent by Messrs. Kelway of Langport (F.C.C. 1918, Dickson & Robinson).
- 29. **Colossal, A.M.** August 27, 1923. Raised by Messrs. Dickson & Robinson.
- 38. **Czar, A.M.** August 27, 1923. Sent by Messrs. Toogood of Southampton.
- 11. **Scarlet Emperor, H.C.** August 27, 1923. Raised by Messrs. Carter and sent by Messrs. W. H. Simpson of Birmingham (A.M. 1918, Carter).
- 19. **Sir Douglas Haig, H.C.** August 27, 1923. Raised and introduced by Messrs. Kelway.
- 25. **Prizewinner dark selection, H.C.** August 27, 1923. Raised by Mr. W. J. Unwin of Histon.
- 36. { **Czar, H.C.** August 27, 1923. Sent by Messrs. Kelway and W. H. Simpson.
- 37. { **White Emperor, H.C.** August 27, 1923. Raised by Mr. Gibbs and sent by Messrs. A. Dickson of Newtowndrds (A.M. 1909, Gibbs).

As will be seen below, with the exception of 'Hollington Dwarf' and 'Scarlet Champion,' all the principal types of Scarlet Runner Beans were represented. Several that had received recognition in previous trials were passed over on account of some admixture or lack of regularity. No good purpose would be served in enumerating these, and the possession of an old award can no longer recommend them.

An error occurred in the sending of 'Hollington Dwarf,' the dwarf type of bean so frequently grown in market gardens, the variety sent being a dwarf French bean; all the varieties grown therefore belonged to the tall section, reaching over 8 ft. in height. The weight given for the crops is from a row 33 feet long.

NOTES AND DESCRIPTIONS.

1. FLOWERS SCARLET.

[For characteristics of the types, see JOURNAL R.H.S., vol. 44, pp. 97-100.]

(1). Seeds purple with black markings.

NE PLUS ULTRA TYPE.

Ne Plus Ultra (W. H. Simpson).—Ready August 24. Crop 99 lb.
Hackwood Park Success (Barr, Toogood).—Ready August 20. Crop 103 lb.
Hill's Prize (Barr).—Ready August 20. Crop 105 lb.
Red Giant (Barr).—Ready August 20. Crop 110 lb.
Recorder (Davis).—Stock not true.

NE PLUS ULTRA IMPROVED TYPE.

Scarlet (Sutton).—Ready August 20. Crop 110 lb.
Conqueror (Dickson & Robinson).—Ready August 18. Crop 102 lb.
A1 (Kelway).—Ready August 13. Crop 126 lb.
Brooklands Giant (Barr).—Ready August 20. Crop 127 lb. Not quite true.

INVICTA TYPE.

Invicta (Barr).—Ready August 16. Crop 106 lb. Scarcely distinguishable from 'Ne Plus Ultra.'

SCARLET EMPEROR TYPE.

Scarlet Emperor (W. H. Simpson), **H.C.**.—Ready August 22. Crop 119 lb.
Scarlet Emperor (Barr, A. Dickson).—Ready August 20. Crop 102 lb.
 Not quite so good a stock as last.
Sir Douglas Haig (Kelway), **H.C.**.—Ready August 18. Crop 124 lb. Pods 8-10 inches long, $\frac{1}{2}$ inch broad; 3 to 5 in cluster; straight, dark green.
Emperor (Garden Supplies).—Narrower pods. Crop 145 lb.
Tremendous (Kelway).—Ready August 18. Crop 141 lb. Seeds rather small. Pods straight, dark, 7-8 inches long, $\frac{1}{2}$ inch wide; 3 to 5 in cluster. Very near 'Emperor.' Stock not quite true.
Exhibition (Dickson & Robinson).—Pods longer. Ready August 13. Crop 150 lb.

CHAMPION TYPE.

Champion Scarlet (Dobbie).—Ready August 20. Crop 120 lb.
Giant Scarlet (Barr).—Ready August 18. Crop 121 lb. Very similar to 'Champion Scarlet.'

BEST OF ALL TYPE.

Exhibition Selected (Unwin).—Ready August 13. Crop 150 lb.
Bounteous (Dickson & Robinson), **A.M.**.—Ready August 16. Crop 152 lb. A fine true stock, with straight dark pods, 12-14 inches long, $\frac{1}{2}$ inch broad; 3 to 6 in a cluster.
Best of All (Barr).—Was near 'Champion' in type. Ready August 16. Crop 140 lb.

(2). Seeds with few black markings.

PRIZEWINNER TYPE.

Prizewinner (W. H. Simpson).—Ready August 16. Crop 126 lb.
Prizewinner Selected (Unwin), **H.C.**.—Rather darker than most. Ready August 13. Crop 118 lb. Pods 12-14 inches.

Prizewinner (Garden Supplies).—Ready August 18. Crop 148 lb. Pods shorter and thicker.
Prizewinner (Barr).—Ready August 20. Crop 138 lb.
Prizewinner (Kelway), A.M.—A fine even stock. Ready August 16. Crop 132 lb. Pods 11 inches long.
Colossal (Dickson & Robinson), A.M.—A very good, true stock. Ready August 13. Crop 135 lb. Pods 12-14 inches long and $\frac{9}{10}$ inch broad, up to 6 in a cluster.
No. 31, sent as a seedling, was good, but no advance on several others.

2. FLOWERS SCARLET AND WHITE.

PAINTED LADY TYPE.

Painted Lady 'Mikado' (Barr); *The Marvel* (Barr); *Empress* (Barr), were all mixed stocks.

Painted Lady Giantess (Kelway).—Had short pods and cropped only moderately.

3. FLOWERS WHITE.

CZAR TYPE.

Czar (Kelway), H.C.—Ready August 13. Crop 180 lb. Pods 9-10 inches long, 1 inch wide.

Czar (W. H. Simpson), H.C.—Ready August 16. Crop 165 lb. Pods as long as and wider than the last.

Czar (Hoogood), A.M.—Ready August 13. Crop 160 lb. Pods as long as in last, but up to 1 $\frac{1}{2}$ inch wide.

Czar (Barr).—Pods narrower than foregoing.

EMPEROR TYPE.

White Emperor (Barr, A. Dickson, Kelway).—Stocks not true.

CLIMBING FRENCH BEANS.

VERY few of these, of which forty-one stocks were sent in, did really well, owing to the cold nights experienced about the time they came through the ground and later. Many plants failed, and the best were:

Phenomene, A.M. August 27, 1922. Sent by Messrs. Watkins & Simpson. A stringless variety which gave an excellent crop of 97 lb. Ready August 20. See vol. 44, p. 107.

July, A.M. August 27, 1922. Sent by Messrs. Carter. Ready August 13, and giving 65 lb. See vol. 44, p. 108.

Mont d'Or Climbing, H.C. August 27, 1923. Sent by Messrs. Barr. Ready August 13. Crop 33 lb. See vol. 44, p. 105. A waxpod variety.

Delicatesse, H.C. August 27, 1923. Sent by Messrs. Barr. Similar to 'Phenomene,' but not quite true. Crop 108 lb. Ready August 20. See vol. 44, p. 107.

VEGETABLE MARROWS AT WISLEY, 1923.

FIFTY-FOUR stocks of Vegetable Marrows (including thirty-five names of varieties) were sown on May 2, and again on May 18, where the plants were to grow, two plants being left close to one another at intervals of 5 feet, and the rows being 12 feet asunder for the trailing varieties and 8 feet for the bush varieties. A moderate dressing of pig manure was given to the ground. The following notes show the awards and the characters of the varieties and stocks.

AWARDS, NOTES, AND DESCRIPTIONS.

A. HABIT TRAILING.

(a) Fruits long.

I. *White*.

AWARD.

3. **Long White Smooth**, C. August 10, 1923. Sent by Messrs. Watkins & Simpson of Feltham.

3. **LONG WHITE SMOOTH** (Watkins & Simpson). C.—Fruit cylindrical, with a slight tendency to be ribbed, creamy-white. Ready August 4. Average 10 fruits.

1, 2, 4. **LONG WHITE** (Dobbie, A. Dickson, Barr).—Fruit long oval, more or less clubbed; greenish-white when young, changing to cream. Stocks all mixed. Ready July 30.

5. **LARGE CREAM** (Carter).—Fruit long oval, some cylindrical with a slight tendency to be ribbed, creamy-white. Stock not quite true. Ready July 30. Average 8 fruits.

11. **CYLINDER** (Brown).—Fruit cylindrical, tapering towards tip, creamy-white; germination very poor. Ready August 1. Average 10 fruits.

14. **LONG WHITE RIBBED** (Nutting).—Long oval, ribbed, creamy-white. Stock mixed.

8. **DUPLEX** (Dunton).—Described vol. 44, p. 115. Ready August 4. Average 17 fruits. Raised by sender.

10. **ROLLER** (Clucas).—Similar to last, but not ribbed, somewhat irregular in shape. Ready August 1. Average 10 fruits. Raised by sender.

2. *Cream*.

AWARDS.

13. **First of All**, H.C. August 10, 1923. Raised and sent by Messrs. Cooper, Taber of Southwark, S.E.

23. **King's Acre Cream**, H.C. August 10, 1923. Sent by Messrs. Barr of Covent Garden, W.C.

13. **FIRST OF ALL** (Cooper, Taber), H.C.—Fruit long oval, cream. Stock requires a little further selection. Ready August 1. Average 12 fruits.

12. **FIRST OF ALL** (Barr).—A mixed stock of No. 13.

24. **WALLASEY CREAM** (Dicks).—Fruits long oval, slight tendency to be ribbed, cream. Ready July 30. Average 11 fruits. Raised by sender.

23. KING'S ACRE CREAM (Barr), H.C.—Similar to but somewhat shorter than last, and with a short neck. Average 9 fruits.

* * *

7. LONG CREAM (Yates).—Fruits cylindrical, somewhat club-shaped, cream, somewhat ribbed. Stock not quite true. Ready August 1. Average 5 fruits.

6. LARGE CREAM (Barr).—Characters as for No. 7. Ready July 30. Average 13 fruits.

25. EXCELSIOR CREAM (Dickson & Robinson).—Very similar to No. 7. Germination poor. Ready July 30. Raised by senders.

3. Green, striped.

AWARD.

19. Long Green Running, H.C. August 10, 1923. Sent by Messrs. Watkins & Simpson.

19. LONG GREEN RUNNING (Watkins & Simpson), H.C.—Fruit long oval, some cylindrical, dark green, striped yellowish-green. Ready July 30. Average 9 fruits.

* * *

15-18, 20. LONG GREEN (A. Dickson, Dobbie, R. Veitch, Carter, Barr) } Very similar to the last but stocks not true.

22. LONG GREEN STRIPED (Nutting)

(b) Fruits oval.

1. Cream.

26. MOORE'S CREAM SELECTED (Barr) } Fruits short oval, deep creamy-yellow. Ready August 1. Average 12 fruits. No. 27 not quite true.
27. MOORE'S CREAM (Simpson)

* * *

28. GOLDEN CREAM (Barr).—Of 'Moore's Cream' type, but deep golden-yellow. Ready July 30. Average 13 fruits.

2. Green, striped.

AWARD.

29. Moore's Cream Striped, H.C. August 10, 1923. Sent by Messrs. Nutting, of Southwark.

29. MOORE'S CREAM STRIPED (Nutting), H.C.—Fruits short oval, dark-green striped yellowish-green, borne close. Ready August 7. Average 21 fruits.

30. MOORE'S CREAM STRIPED (Carter).—A mixed stock of No. 29.

31, 32. TABLE DAINTY (Simpson, Barr).—Of No. 29 type, but mixed.

(c) Fruits round.

1. Creamy-white.

33, 34. PEN-Y-BYD (Barr, R. Veitch).—Small. Stocks very mixed.

* * *

54. HUNDREDWEIGHT (Heinemann).—Fruits round, deep cream striped pale green. Ready August 7.

2. Green, striped.

35. PEN-Y-BYD GREEN (Barr).—A very mixed stock.

3. Orange.

AWARD.

40. ROTHERSIDE ORANGE, H.C. August 10, 1923. Raised by Mr. H. Chapman, and sent by Messrs. W. H. Simpson of Birmingham.

40. ROTHERSIDE ORANGE (W. H. Simpson), H.C.—Fruits flat, round, small, creamy-orange. Ready August 7. Average 8 fruits.

37, 38, 39. ROTHERSIDE ORANGE (Watkins & Simpson, Barr, R. Veitch).—Less good stocks of No. 40. No. 38 failed.

B. HABIT SEMI-TRAILING.

(a) Fruits long.

1. *White*.

41-43. FELTHAM PROLIFIC (Watkins & Simpson, Barr, R. Veitch).—Fruits long oval, creamy-white, borne close. Ready August 1. Average 7 fruits. Raised by Messrs. Watkins & Simpson.

(b) Fruits oval.

1. *Cream*.

9. ALL SEASONS (Carter).—Fruits like 'Moore's Cream.' Ready August 4. Average 14 fruits. Raised by Mr. A. Basill. Not in commerce. Habit not fixed.

(c) Fruits round.

1. *Green mottled*.

36. EPICURE (Barr).—Fruits flat globular, dark dull green, mottled paler, small. Ready August 7. Average 10 fruits. Stock not quite true.

C. HABIT BUSH.

(a) Fruits long.

1. *White*.

44. EARLY WHITE BUSH (Barr).—Fruits long oval, creamy white, slight tendency to be ribbed; borne close. Ready July 30. Average 5 fruits.

45. WHITE BUSH (Carter).—Similar to No. 44.

2. *Green, striped*.

AWARD.

48, 21. **Green Bush, H.C.** August 10, 1923. Sent by Messrs. Nutting, Barr.

48, 21. **GREEN BUSH** (Nutting, Barr), **H.C.**.—Fruits long oval, dark green, striped paler, borne close. A remarkably early variety. Ready July 30. Average 8 fruits. No. 21 sent as 'Chusan Green.'

46. **BUSH GREEN** (Barr).—Similar to No. 48. Stock not true.

47. **BUSH GREEN** (Watkins & Simpson).—Similar to No. 48, but fruits somewhat paler.

(b) Fruits custard.

1. *White*.

AWARDS.

49. **Long Island Bush, C.** August 10, 1923. Sent by Messrs. Watkins & Simpson.

52. **Custard, C.** August 10, 1923. Sent by Messrs. Simpson, of Birmingham.

49. **LONG ISLAND BUSH** (Watkins & Simpson), **C.**.—Fruits lobed, flat, round, ribbed, white, borne close. Ready August 7. Average 5 fruits. A true stock of 'Silver Custard.'

50. **WHITE CUSTARD** (Barr).—A mixed stock of No. 49.

* * *

52. **CUSTARD** (W. H. Simpson), **C.**.—Similar to No. 49, but creamy-white. Ready August 10. Average 9 fruits.

51. **CUSTARD** (R. Veitch).—A mixed stock of No. 52.

2. *Golden*.

53. **GOLDEN CUSTARD** (Barr).—Fruits lobed, flat round, ribbed, golden-yellow, borne close. Ready August 1. Average 3 fruits. Mixed stock.

BOOK REVIEWS.

"Dwarf and Slow-Growing Conifers." By Murray Hornibrook. x + 195 pp. 8vo. (Country Life, London, 1923.) 10s. 6d. net.

BY only one previous author has an attempt been made to publish an exhaustive description of the numerous abnormal dwarf forms to which conifers of most species are prone to sport. L. Beissner, in the first edition of his "Handbuch der Nadelholzkunde" in 1899, enumerates 100 of these, and ten years later, in his last edition, 160. Mr. Murray Hornibrook's book contains very careful, botanically accurate, and often elaborate descriptions of no less than 460 pygmy coniferous trees. The immense pains he has taken to distinguish correctly the various forms included in home and continental nurserymen's catalogues, and grown in public and private collections, is beyond all praise. The cultivation of these monstrosities has received much attention in recent years, largely owing to their popularity for rock gardens; and, indeed, that would seem to be their most proper sphere. Mr. Hornibrook suggests that they are suitable also for the small garden where too often forest trees are planted close to a house, where, after excluding the sun for many years, they are usually lopped into clothes-props. The writer agrees with Mr. Hornibrook that dwarf conifers should be strictly excluded from the Pinetum.

The photographs illustrating the book are a great embellishment to it, and include many of specimens growing in Professor Sargent's fine collection at the Arnold Arboretum and elsewhere in America. The book contains a complete index.

The occasional retention by Junipers, Thuyas, Cypresses, and some other conifers of their juvenile foliage has caused immense numbers of dwarf forms to be selected in the seed-bed; in the case of Pines and Spruces it seems that grafts and cuttings from 'Witches' Brooms' are the most frequent source of origin. Mr. Hornibrook strongly recommends propagation by cuttings rather than by grafts. No tree has produced so many dwarfs as the Norway Spruce. Mr. Hornibrook devotes thirty-nine pages to, and actually describes no less than forty-seven distinct dwarf forms of, that species, which he divides into six groups. That the book is exhaustive is borne out by a description being included of a dwarf form of *Picea aurantiaca* (Masters), one of the recently introduced Chinese spruces, of which there can be few normal trees either in America or Great Britain of 6 feet high.

Of conifers dwarfed by environment—that is, by the great altitude or severity of climate of their habitat—a few retain their character when moved to conditions favourable to normal growth. Many such

instances are included in the author's enumeration. Only one absentee is noticed by the writer. He has dug up, at 10,000 feet, plants of *Larix Lyallii*, the woolly-twigged Larch of the high Rockies, and transplanted them to a Scottish nursery, where their growth does not exceed half an inch a year, and the annual rings of the stem of a plant not over a foot high and an inch in diameter indicated an age of over forty years!

The book under review should be in the hands of all who grow these dwarf plants, as well as of all nurserymen who offer them. It is to be hoped that a noticeable improvement will result in the nomenclature of catalogues, in which inaccuracies and confusion of names abound both at home and abroad.

In a melancholy little note at the beginning of his book Mr. Hornibrook informs us that the recent happenings in Ireland have necessitated the breaking up of what must have been the most extensive collection of dwarf conifers in the world, which his garden at Knapton contained. It is, however, some comfort to learn that the best specimens have found a home in the Royal Botanic Gardens at Glasnevin.

"A Manual of the Timbers of the World: their Characteristics and Uses." By A. L. Howard. 8vo. xvi + 446 pp. (Macmillan, London, 1920.) 30s. net.

A list of timbers with their origin (where known), characteristics, and uses, illustrated with pictures of forest scenery, and followed by chapters on the conversion and preservation of timber, specification and conditions of growth, and artificial seasoning. Pages 328 to 384 are occupied by Laslett's Tables showing the gravity, breaking and crushing strains and so on of a large number of timbers. These tables would have been more valuable if the kind of timber tested had been specified at the head of every table, and more readily referred to if the several tables had been included in the Index.

"First Book of Grasses: the Structure of Grasses explained for Beginners." By Agnes Chase. 8vo. xiii + 121 pp. (Macmillan, New York, 1922.) 6s. net.

Grasses are no more difficult to "determine" than are plants with more conspicuous flowers, provided one understands their structure. This little book used conscientiously will help the student to do this, and thus open out to him a field hitherto perhaps difficult to enter into, but once entered of very great interest to explore.

"Our Wild Flowers and How to Know Them." By E. F. Daglish. 8vo. 127 pp. (Thornton Butterworth, London, 1923.) 6s. net.

It is very difficult to produce a popular book on the identification of wild plants by means of "keys." The path of the essayist of such a task is beset with pitfalls, and the author of the present little book has, we fear, fallen into many of them.

Who, for instance, would look for the Yellow Flag in a group devoted to "Snapdragon-shaped flowers," or the Milkwort among "bell-shaped" ones? Who that has seen its wonderful colours and bright tufts on, say, Salisbury Plain, would say the latter is "a small, inconspicuous plant, easily passed unnoticed"? There one cannot help seeing it though travelling along the fine roads over the plain in a modern motor-car. Why should the very uncommon "Yellow Balsam" be included and the Bee Orchis or the Spotted Orchis omitted? Why should the Wild Clematis with no petals be grouped with flowers having four, and why should the Corncockle be removed by the space of many pages from its common relative, the Red Campion? These are only a few of the anomalies.

"The Home Vegetable Garden." By Ella M. Freeman. 8vo. 214 pp. (The Macmillan Co., New York, 1922.) 8s. net.

Written by a woman for women, this book is designed to arouse interest in gardening and encourage the cultivation of vegetables in American homes. The opening chapter, entitled "The Joy of a Garden," shows an enthusiasm which should prove infectious, and those which follow give clear and readable cultural instructions for vegetable growing under American conditions.

"Allotment Gardening for Profit." By E. T. Ellis. 8vo. 90 pp. (James Clarke & Co., Ltd., London, 1923.) 2s. net.

This book is written in much the same style as "Jottings of an Allotment Gardener," but whereas that dealt with the cultivation of crops, this is concerned with profit only. Two chapters are devoted to general considerations, and there are single chapters on vegetables, herbs and salads, fruit, flowers, sidelines, and the sale of produce. But although fruit, flowers, etc., are dealt with, the author would rely principally upon vegetables, and his plan is to grow, not one crop each season, but three—e.g., a salad crop, potatos, and a cabbage crop. The directions relating to any particular crop are extremely brief, all the important vegetables being dismissed with an average of six lines, and then toward the end of the book some calculations are given. There it is shown that if a man cultivates 1,000 sq. yds., and if he obtains crops weighing $7\frac{1}{2}$ tons, and if he sells those crops direct to the consumer at 1s. per lb., he will receive £840, of which 62½ per cent. should be profit. While there is no doubt that an allotment can be made to pay, we think that the publication of estimates such as this is likely to do more harm than good. The book contains much that is sound, but some things which are not, and as the author repeatedly deplores his lack of space we think it would have been well if he had eliminated the imaginary conversations and substituted some concise information instead of constantly referring his readers to his other publications.

"Practical Plant Biochemistry." By Muriel Wheldale Onslow. vi + 194 pp. Second edition. (Cambridge, the University Press.) 12s. 6d. net.

This book is intended to be a guide to the student of botany engaged on an actual laboratory course of practical biochemistry, and contains, in addition to systematic treatment of the subject, directions for carrying out a most comprehensive series of experiments. The student of botany who has the time to carry out all these experiments is fortunate, and if the exercises are carefully and intelligently performed he should have obtained a very thorough grasp of the subject. We are left with the impression, however, that he will have a very long row to hoe. On the other hand, should only a part of the exercises be completed, the style in which these exercises are set out—*i.e.*, in the form of *directions*—makes the reading of the remainder or any of them wearisome and apt to be uninformative. We had hoped that this method of setting out practical exercises, once so characteristic of chemistry text-books, had been superseded by brief descriptive narratives of the procedure involved, which, while sufficient to facilitate practical work, are also of value to the mere reader.

The size of the book makes condensation of the systematic and explanatory treatment of the subject necessary. Within the limits of space this treatment is, however, excellent and very thorough indeed. The complexity of the subject involves a preliminary study of organic chemistry, but we cannot refrain from a smile at the author's reference to this, in the preface, as elementary. It is indeed a book for the very serious student, not for the general reader.

The get-up is unexceptionable, and each chapter is accompanied by ample references to authorities and original literature.

"Practical Plant Ecology." By A. G. Tansley, M.A., F.R.S. 228 pp. 8vo. (Allen & Unwin, London, 1923.) 7s. 6d. net.

'Ecology,' the study of plants in their homes, is fast passing from a desultory to an exact method—that is, the methods of describing the vegetation of a given area are becoming more precise.

This little book is "a guide for beginners in field study of plant communities," and it is admirable in every way. It shows the path to follow, and points out the pitfalls to avoid. The work involved calls for concentrated and continued effort. It is not something to be taken up at odd moments and neglected for long terms, and it is therefore work that should be an excellent education for the botanical student who is prepared really to study and not merely to get up the subject for examination; and it should also be a useful guide to the more

mature field botanist who is no longer content to find, press, and preserve a rare plant. To all such we commend it.

"The Glory of the Garden." By M. G. Kennedy-Bell. 8vo. v + 188 pp. (Black, London, 1923.) 5s. net.

The result of much reading and collecting is found between the covers of this small book. It is a compound of quotations from poets, herbalists, works on magic and legend, fact, and fancy, from the Bible to Maeterlinck and Paracelsus to Mendel. Yet they are so well arranged that they make pleasant consecutive reading.

Weather, bird, and bee lore, legends of saints, devils, and fairies, astrology and mythology are dealt with in separate chapters, and no reader could fail to learn many facts or associations that would greatly add to his interest in plants and gardens.

It is an easy way of gaining a knowledge of old garden lore, and had it been thought fit to give exact references to all the sources of information would have been a very useful work. Oil of Bergamot, used in perfumery, is extracted from an orange, *Citrus Bergamia*, and not as stated from Bee-Balm.

"A mackerel sky
Is very wet or very dry"

is referred to as "a very cryptic saying concerning a windy sky." Surely the beautifully rippled effect of clouds known by this name occurs only in calm weather, and results from either the breaking of dense cloud into clear sky, or, by the reverse process, the formation of clouds in a clear sky denoting a change of weather. Thus the more familiar ending,

"Not long wet, not long dry,"

is more enlightening.

"The Potato: Its Culture, Uses, History and Classification." By William Stuart. 8vo. 518 pp. (Lippincott, London, 1923.) 12s. 6d. net.

The United States has given us a number of books on the Potato. This one of Mr. Stuart's is the best. It is a handsome, well-illustrated volume extending to over 500 pages. In the preface the author says "no effort has been made to discuss production methods in foreign countries. . . . The author's actual observations and field studies, extending over many years and many States, are used in making the treatment of each topic more practical and complete."

In average crop from an acre in the United States ranks very low—2·4 tons against Britain's 5·4. The low average can be very largely increased, Mr. Stuart says, "when proper cultural care is given to the crop." Growers of the potato crop in Britain have nothing to learn from the methods of cultivation and manuring adopted by growers in the United States.

The old question of cut *versus* whole seed is discussed at considerable length, and the results of varying the planting distances; but we do not need to go to America for enlightenment on such points. Mr. Chittenden's work for the Royal Horticultural Society at Wisley is the last word on spacing and size of tuber. Cutting sets seems much more general than with us, and several illustrations of cutting methods are given. Irrigation is general in the southern and western States, and the methods are fully described. In Florida artesian water is usually found at 150 to 175 feet, and a 4-inch well will pump water enough to irrigate 40 acres. Early crops are produced in great quantities in the southern States and are got off in time to be succeeded by peas or corn. In some States second crops are grown. Tubers from the first crop are planted to give a late crop, which is largely used for the production of seed potatoes intended for use in planting the ensuing year's early crop. There is a point here worth noting—this second crop, not being fully matured, will furnish excellent seed.

A series of experiments carried on over a number of years gave a heavier yield on the flat than ridged. This experience has been confirmed in a small way in Britain, and it might be well worth while having it tested out at Wisley.

Production costs.—These vary as much as they do in our own country, from £15 to £40 an acre; but, as the writer says, the cost is only interesting in relation to the crop. Mr. Stuart pointedly states: "I am firmly convinced that the only solution of the present high cost of production is that of increasing the yield per acre through the use of high-grade seed and the adoption of up-to-date methods of cultivation, harvesting and marketing." The chapter on harvesting and grading is one of the most interesting and helpful in the whole book, and

one from which British growers can learn a good deal. Storage is largely done in large storage houses built for the purpose.

Between 40 and 50 pages are devoted to diseases and over 30 pages to insect pests. Most of the former we have experience of in Britain, but we are spared most of the latter. Preventive measures are fully discussed and well illustrated.

Dry spraying seems to be increasing in favour. Work on diseases does not seem to be any further advanced than in Britain. Mosaic and leaf-roll are followed by the same disastrous results to crops as in this country. Varieties and classification are fully dealt with in the concluding chapters, which are beautifully illustrated by a number of plates in colour. A book to add to every potato grower's library!

"Gardening for the Twentieth Century." By Charles Eley, M.A., F.L.S. 8vo. xiv + 256 pp. (Murray, London, 1923.) 16s. net.

The writer of this review loves trees and shrubs; he heartily endorses all that Mr. Eley says in their praise; he strongly holds that shrubs ought to find a home in gardens of all sizes far more often than they do; he feels sure that the neglect of them that characterizes the average gardener is due to ignorance of their charm and beauty and value as permanent and not costly features of the garden; but with all this he cannot go so far as the author.

By implication—for they are not mentioned—bulbous and herbaceous plants, hardy and tender, annual and perennial, rampant and miffy, plants of rocks and pastures, bogs and streamsides, all are excluded from the Garden of the Twentieth Century; or, if not actively excluded, passively borne with only, for no mention is made of them.

The garden pictured in the mind after reading this book is one of lawns and shrubs and trees, hedges and climbing plants—beautiful, no doubt, but it need be no less beautiful if room is found for other things; but perhaps the author did not mean to exclude them, only chose a title which does perhaps a little mislead.

Anyway, all that is here is sound, the work of an observant lover of the beautiful in nature and garden art, practical, and pleasant to read.

While we cannot altogether share with him his fear of hybrids or hold up to admiration the wild form because it is a wild form which happened to be placed in nature in situations where hybridity was prevented and where surroundings were genial enough for it to survive, yet where his admiration is for those clean-cut plants which seem to bear the signs of high lineage there we and all other garden lovers will be with him.

His warnings as to hardiness and adaptability to harsh climatic conditions in the plants that are to form the skeleton of the garden are well-timed. The desire for the rare ought not to override the caution which enjoins a careful selection to form the basis of the garden, nor will it if the wise advice the author gives is permitted to prevail.

Here is a book eminently sane, eminently readable, often witty with a wit that leaves no sting, eminently practical, well printed and well illustrated, and one that ought to be a great help to the beginner and to anyone who desires to set his garden right.

"Outline of Genetics: with special reference to Plant Material." By Merle C. Coulter. 8vo. vii + 211 pp. (University Press, Chicago, 1923.) 7s. 6d.

Little by little the phenomena of inheritance are becoming explicable in terms of Mendelian laws, and evidence of their wide, if not universal, applicability is being gradually and even rapidly accumulated. There is thus need for frequent revision of the accounts prepared for students, and the present is an admirable one, whether for elementary or for advanced students. We cannot in the short space available deal fully with the book in detail, but would draw especial attention to the excellent exposition of the factor hypothesis, linkage, inheritance of quantitative characters, and sterility, all of which are difficult matters to make clear, but every one of which is dealt with lucidly and fully.

"Nature all the Year Round." By Professor J. A. Thomson, M.A., LL.D. (Pilgrim Press, London, 1921.) 12s. 6d. net.

This is a book of simple talks upon Nature, clear, accurate, and interesting; a good book for children, old and young; a book to inspire and send to Nature to see what happens all around us.

Beginning in spring—the time of opening—the author goes week by week through the year, and for each week writes an essay on some happening in Nature's Calendar.

"The Naturalization of Animals and Plants in New Zealand." By the Hon. Geo. M. Thomson. (Cambridge University Press, 1922.) 42s. net.

New Zealand is separated from the nearest great land area, Australia, by a thousand miles; and furthermore there is a fairly accurate record of the fauna and flora already there when Europeans first visited it. Thus a unique problem awaited a competent author, and Mr. Thomson has made good use of his opportunity.

He started in hope that the investigation of the introduced animals and plants to such altered environment might lead to fresh light upon natural selection, but after fifty years of observation is obliged to state that he is aware of no definite permanent change in any introduced species. Nor has the effect on the original species been so marked as might have been expected. Part III. of this great work deals with the introduced flora, and more than six hundred species are listed as being able to reproduce themselves naturally.

Many interesting facts are to be found among the more prosaic records of dates and distribution. Thus the Scarlet Mistletoe (*Loranthus Colensoi*) finds a suitable host plant in *Crataegus Oxyacantha*, which suggests that it might be grown in the milder parts of Britain. Gorse shows changes in form and in colour, from yellow to white. Guinea-pigs in cropping grass very close would not touch *Viola odorata*, thus enabling it to increase. The whole work has been so carefully planned and clearly written that it makes pleasant and interesting reading.

"Frequented Ways." By Marion I. Newbiggin, I.Sc., F.R.G.S. (Constable, London, 1922.) 15s. net.

This is a book that should be read by all who enjoy looking out of the window on a long journey. Perhaps it may even induce those who rush half across Europe in sleeping berths, and care more for the quality of their meals *en route* than for the character of the country they pass through, to try a journey by a slower train, that they may acquire and share with the author the pleasure of studying the character of the lands and their vegetation as they pass through.

The descriptions of the physical geography of the main routes of travel in Europe are pleasant reading, but the great charm of the book for lovers of horticulture will be found in the chapters devoted to The Plant and its Home; The Primeval Forest; Myrtle and Bay; Meadow, Wood, and Pasture in Alps.

One is tempted to quote from each if space permitted. In the first chapter mentioned we find :

"In general the notable contrast between the Mediterranean slopes and the English wood are due to the fact that in the former area, while the temperature throughout the year is high enough for some plant growth, water is deficient during the summer season; in the latter, while water is present in the soil in sufficient amounts for plant growth throughout the year, the temperature in winter is too low. In the Mediterranean area, therefore, plants sensitive to drought can only appear above the surface during the cooler and damper season; those which are permanently above the surface must be drought-resistant."

And again :

"For those who have no detailed interest in botany the point of importance is to realize that, let us say, the chestnut woods which fringe the railway line as one ascends towards the Mt. Cenis tunnel on the Italian side, the beech woods near Sixt, the avenues of catalpas at Argelès in the Pyrénées, the fir wood of any Swiss valley, the patches of Robinia and the willows along the water-courses in the plain of Lombardy . . . have each and all a tale to tell."

"Often the contrast between wood and alp is sudden and striking. There is not only a change in the vegetation but also in the slope and the nature of the surface; and the fact that the alp has almost always a cluster of cheese making sheds or chalets accompanied by a little inn, while the wood is without sign of human life, accentuates the contrast."

"In these high pastures [plants] are 'stocky' in habit, and, as compared with their allies on the lower pastures, contain far less woody matter. They form, therefore, a far more nutritious food for cattle. . . . Alpines economise water as much as possible; they tend to be hairy (edelweiss) or to have fleshy leaves (houseleeks or alpine Linaria); they have a characteristic tufted or cushion mode of growth (*Silene*) which prevents loss of water and diminishes risk of damage from snow. . . .

"The fact that the plants are all low-growing and lie close to the soil makes those of the pastures which lie on steep slopes difficult to walk upon, especially in dry seasons. Many of the edelweiss accidents are due to this fact."

Here is a bit of good advice in choosing one's destination :

"If you insist everywhere upon 'comfort' you will necessarily carry your native atmosphere with you wherever you go, and it will prove but a distorting medium through which to see your new surroundings."

"A Naturalist's Calendar." By Leonard Blomefield. Edited by Sir Francis Darwin. (Cambridge University Press, 1922.) 3s. 6d.

This is a reprint of a remarkably full list of observations made near Cambridge over a period of seventeen years in the first half of the nineteenth century.

These include the singing periods of birds, the first appearance of insects, flowering, leafing, and defoliation of plants.

The earliest and latest records for each are given and a mean was calculated from these data. The following words of Darwin, quoted in the introduction, are fully justified with reference to this concise but copious record:

"I think it is very amusing to have a list before one's eyes of the order of appearance of the plants and animals around one; it gives a fresh interest to each fine day."

"Studies in Fossil Botany." Vol. II., "Spermophyta." By Dr. D. H. Scott, F.R.S. Ed. 3. xvi + 446 pp. 8vo. (Black, London, 1923.) 21s.

The last edition of this volume was published in 1909, and since then various discoveries have been made concerning the ancient flora of the world, which have led the author to revise completely his views regarding the origin of the group Pteridosperms. These early plants were then considered to be derived from ferns—a sort of step up from ferns to seed-producing plants. They are now considered to be the most primitive of seed plants, as ancient as the oldest of the ferns or fern allies so far as they are known.

The book is therefore thoroughly revised in the light of the new knowledge and wholly rewritten. The structure of the fossil forms is carefully described and well illustrated, and the various theories connected with them are fully examined. The author's lucid and easy style makes the book a pleasure to peruse, and will appeal to a wider audience than to the botanical students preparing for the higher examinations.

"Outlines of Evolutionary Biology." By A. Dendy, F.R.S. Ed. 3. xlvi + 481 pp. 8vo. (Constable, London, 1923.) 10s. net.

This is an excellent review of the present position regarding evolution. None doubt that evolution has taken place—indeed, is taking place—but many question the methods by which evolution takes place. The conflicting theories are clearly stated and discussed, usually without doing more than to indicate their bases and the side to which the author leans.

"Diseases of Glasshouse Plants." By Dr. W. F. Bewley. 8vo. 208 pp. (Bean Bros., London, 1923.) 12s. 6d. net.

Although our knowledge of diseases of plants is based largely upon the splendid pioneer work of Berkeley, one of our own countrymen, about the middle of last century, yet there have appeared since his time very few complete works on this subject from British investigators. It is true the publications of Massee, particularly his "Diseases of Cultivated Plants" (1910), helped to supply all those interested in such matters with a considerable amount of valuable information, but Massee was essentially an herbarium worker, who occasionally had access to a laboratory, and only rarely investigated the diseases he described from the point of view of the grower. It is not meant to infer that British workers have been either idle or second-rate, but while many have carefully and exhaustively studied a few diseases, none has published a general account dealing fully with the diseases of any particular group of plants.

The appearance of Dr. Bewley's book is therefore all the more welcome, as it has been written by one who has had every opportunity for some time past of studying plants and their maladies from the grower's standpoint. It is the first book written in England, by a trained man of science, dealing with plant diseases from a practical and economic aspect rather than from that of the botanist confined to a laboratory and dependent for his data on material "sent in" and on the observations of others. To a large extent growers are themselves responsible for its appearance, for the foundation of the Cheshunt Experimental Station, of which Dr. Bewley is the director, was largely supported by the growers of the Lea Valley, an example well worthy of imitation in other parts of the country.

In the first two chapters the author has emphasized the great importance of hygienic conditions of glasshouses, and the diseases of plants due solely to the environment, such as light, heat, humidity, and soil. These two chapters alone render the book of the utmost importance to every grower of plants under glass, and should be read by all concerned in such matters. Concluding a paragraph on the heating of glasshouses, Dr. Bewley says (p. 24): "It is a little surprising,

perhaps, that the various associations of glasshouse growers have not enlisted the services of a skilled engineer to study the heating question, for this would lead to a considerable saving in the cost of heating," a comment on present conditions which it is hoped will bear fruit. The two final chapters on "general reflections and considerations of disease treatment" are again of general interest, and should be read and understood by all. In these the various methods now in practice of sterilizing soil and water, spraying and dusting are fully described, and the latest work of the American growers, particularly as regards dusting, also receives attention. Chapters III., IV., and V. deal with fungus diseases of plants, Chapter VI. with diseases due to bacteria, and Chapter VII. with mosaic diseases.

The arrangement of this section of the book is according to the part of the attacked plant; thus root diseases, stem, leaf, and fruit diseases are treated in succession, an arrangement which is open to the objection, perhaps, that the diseases of particular plants do not come all together, but are scattered about the chapters previously mentioned. Although more suitable for the student and pathologist, it is to be doubted if this is the best method of making such information readily accessible to the grower, for whom, the author states, the book is chiefly written. Apart from this, these chapters contain the most complete account yet written of the diseases of tomatoes and cucumbers known to occur in England. A few which might be introduced are also mentioned in some detail. While the symptoms of each disease are clearly described in the majority of instances, some might with advantage have been extended. Thus in the account of the "foot rot" of tomato on p. 64 no mention is made of the production of a tuft of secondary roots from the stem just above the attacked primary system, which is such a characteristic feature in young tomato plants suffering from this disease. On p. 99 the powdery mildew of the cucumber is stated to be caused by *Erysiphe polygoni* D.C. and not *Erysiphe cichoracearum* D.C., as accepted by most other authorities.

Besides the diseases of tomatoes and cucumbers, with which Dr. Bewley is so familiar, those of other plants also find a place. Thus the diseases of carnations, roses, sweet peas, chrysanthemums and bulbs receive some attention, although it is doubtful if such short references as for instance occurs on p. 107 under the heading of "Die back of Carnation" will be of much use to the carnation grower faced with the yet unsolved problem of dealing with the increasingly serious disease more generally known as "stem rot." Again, under the heading of "Bulb Rots" on p. 71, a short description is given of *Sclerotium tuliparum* Klebahn, and the author concludes by drawing attention to Ramsbottom's work on "the disease." But this is clearly incorrect, for Ramsbottom's paper quoted in the bibliography at the end of the volume deals with the eelworm disease of narcissus. The eelworm disease receives no mention, but on p. 53, under "Diseases of Unknown Origin," the description of a "yellow stripe disease of daffodils" is equally applicable to the eelworm trouble.

In the present volume the diseases affecting grapes, figs and peaches are not considered.

The book is illustrated with photographic reproductions, many of them excellent; but their value would have been further enhanced had some indication as to size been included in the explanations at the foot of each. This particularly applies to fig. 19 (facing p. 88). There are, in addition to these, numerous text figures which, though clear, are decidedly diagrammatic, though this is not stated; thus the diagram of a peritheciun with its contained asci in fig. 3 conveys a wrong impression to the student and is of no particular value to the grower. Again, it is hardly accurate to indicate the *white* lesions due to rose mildew by *black* dots. There are two misprints in the text as to references: one on p. 67, where Morgan (34) should be Mercer (34), and on p. 147, in the very clear account of mosaic diseases, Beijerinck's theory (8) should be (11). At the end of the book are two useful lists of diseases of tomatoes, one containing the names of those commonly found in England, the other giving those found only occasionally. A selected bibliography of the most important original papers relating to the diseases described is included, and finally there is a very complete index. The print is good, clear and large. Altogether it is a most admirable work, and the most important which has yet appeared in this country.

"Foundations of Agricultural Economics." By J. A. Venn. xv + 397 pp. (University Press, Cambridge, 1923.) 16s. net.

While this book has little direct bearing upon horticulture, it is one which all who use the ground for the production of crops would do well to peruse. It deals with the various charges which fall upon the land, and their effect upon country life from the historical point of view, and endeavours to evaluate their influence upon production.

"Successful Spraying." By P. J. Fryer. vii + 154 pp.; 82 figs. (Ernest Benn, London, 1923.) 7s. 6d. net.

The object of this book is to present to the grower a concise and simple guide to the principles underlying spraying. The author successfully treats this important subject without touching upon its purely scientific aspect or attempting an exhaustive treatise of pests.

There are fifteen chapters, which deal with such matters as ensuring efficient spraying, the object of spraying tactics used in combating pests and the methods used against them, the question of water supply, fungus diseases, insecticides and fungicides, up-to-date spraying and spraying machinery, fumigation, and some of the more important insect pests and fungus diseases of hardy fruit, together with remedial measures.

The illustrations are excellent and consist of original photographs taken by the author.

An important factor in effective spraying is the water supply, and this question is dealt with in detail. Stress should be laid upon the following facts: (i.) Derris, although toxic to young caterpillars, is of little value when used against older caterpillars; and (ii.) tetrachlorethane is fatal to chrysanthemums under glass. Notable omissions are the varieties of apples and gooseberries damaged by lime-sulphur wash; the use of grease bands to trap the migrating woolly aphides from stem to root and vice versa; gooseberry and currant scale; and European gooseberry mildew. Unnecessary repetition occurs when the life history of the pear midge is given on p. 67 and again on p. 143. The author advocates the use of Stockholm tar, p. 108, in coating over the cut surfaces of plum trees attacked with silver-leaf fungus, but the recent researches of Brooks and Storey show that its use is disappointing and that gas tar is preferable.

It is strange to read, p. 113, that the use of oil emulsions against pests on trees and plants in leaf is condemned, considering that such emulsions are so efficient against young scale insects.

On p. 138 we read that an efficient grease "should remain sticky till after the end of January, when all the females [winter moth] will have ascended the trunk"; but an efficient grease should remain sticky for at least seven months, when it would be unnecessary to spend time in regreasing to catch the female March moths. The treatment advocated against lackey moth, p. 139, is doubtful because (i.) nearly full grown caterpillars do not live socially in nests, and (ii.) lead arsenate wash would be more effective at this period than derris. This book can be strongly recommended to the grower who wants a handy volume in which he will find such information as concerns his plants set out in a concise and understandable manner.

"Pests." By Ray Palmer and W. Percival Westell. v + 413 pp.; 47 plates, including 3 coloured, comprising 132 figs. (H. J. Drane, London, 1923.) 25s. net.

In the title of this book "pest" is used in its widest sense, and includes insects, mites, molluscs, worms, birds, reptiles, amphibians, mammals, fungi, and weeds.

There are seven parts, which are arranged alphabetically. Part I. deals exclusively with insects, e.g., their general characters and classification, the injurious species attacking garden, farm and forest plants, animal pests and household insects, while the final section includes the beneficial species.

In Part II. we find other animal pests, such as mites, molluscs, worms, birds, and the higher animals, and here again the beneficial species are not forgotten.

Part III. is devoted to the fungus diseases of plants, while Part IV. includes the chief weeds of farms and gardens, and methods of prevention.

Part V. gives the preparation and method of using insecticides, fungicides and fumigants, and stress is laid upon the importance of efficient soil sterilisation and spraying. Antidotes for the various poisons are given.

Part VI. will be found extremely useful on account of the general information therein, e.g., weights and measures, together with French and American equivalents; cubical capacity of houses; poisonous plants; seed corn dressing; estimation of specific gravity; capacity of tanks, etc.

The last part gives comprehensive and well-constructed identification tables by which most insect pests and fungus diseases may be readily identified and their treatment. The remaining sections give a monthly calendar of necessary spraying operations, a glossary of scientific terms and indexes of scientific and general names.

In a book of this description, which is necessarily a compilation of various authors' works, numerous mistakes are bound to occur. Some misleading

statements are found: p. 31, it is futile to spray apple trees with lead arsenate against apple-blossom weevils; p. 62, caustic alkali wash will not kill aphis eggs; p. 52, lead arsenate wash against case-bearers is useless: only nicotine and soap is efficient; pp. 86 and 89, lime-sulphur will be found to be more effective than caustic alkali wash against scale insects on fruit; p. 180, fumigating with nicotine or hydrocyanic acid gas against red spider is useless; p. 322, advocating nicotine spraying when trees are in blossom is unwise. The outstanding omissions are stem (*Tylenchus devastatrix*) and strawberry (*Aphelenchus fragariae*) eelworms; shot-hole borer (*Xyleborus dispar*); swift moths (*Hepialus* spp.); apple-leaf miner (*Lyponeta*), and other spp.; and Paris Green as an ingredient of bran mash against surface caterpillars.

The illustrations, most of them original, are of outstanding merit, with the exception of fig. 122, depicting eelworms.

"Insecticides and Fungicides. Spraying and Dusting Equipment." By O. G. Anderson and F. C. Roth. xvi + 349 pp.; 70 figs., 1 chart. (Chapman & Hall, London, 1923.) 15s. net.

This manual is designed to instruct students in the preparation of insecticides and fungicides and in the construction, selection, and operation of spraying and dusting machinery. The chemical aspect is presented in a simple form devoid of all technicalities.

Great importance is attached to field work in the elucidation of problems.

The introductory chapter closes with a list of the apparatus necessary for carrying out experiments in laboratory.

Part I. (pp. 1-174) gives a series of laboratory tests grouped under the following headings: stomach poisons, contact poisons, fungicides, combination sprays, miscellaneous materials and fumigants, whilst the two final sections are devoted to the study of spraying equipment and cost problems.

Part II. deals with the control of insect pests and plant diseases, spraying machinery and accessories, dusting outfits, miscellaneous information and practical hints on running a gas engine.

The appendix includes lists of spray materials and machinery, and convenient ruled pages are provided for filling in the prices of same.

Many of the formulæ differ considerably from British standards, e.g., p. 54, the recipe for making Burgundy mixture—the formula given is a 1-1½-50 against our 4-5-40; and surely the recommendation (p. 83) to spray vegetable crops with nicotine is inadvisable, at least in this country!

Throughout the book the liquid measure is the American standard, i.e., 1 gallon of water weighs 8 lb.

This work is intended primarily for American students, but as its scope is so wide, especially the second part, it will prove to be an excellent textbook to horticultural and agricultural students in all parts of the world.

"Fungoid and Insect Pests of the Farm." By F. R. Petherbridge. Ed. 2. 177 pp.; 55 figs. (Cambridge University Press, 1923.) 6s. net.

The author points out that recent research has necessitated the rewriting of certain parts of this book, e.g., the life histories of the Frit and Wheat Bulb Flies respectively (first edition reviewed in R.H.S. JOURNAL, xlvi. pts. II. and III., p. 451).

The figures, which comprise drawings and photographs, are excellently reproduced.

The arrangement of the book is to deal with fungoid diseases in Part I. and insect pests in Part II. An introductory chapter deals with the life-histories of fungi and insects respectively.

Among the chief fungus diseases we find Phytophthora, wet rot and wart diseases of potatos; damping-off of seedlings; finger and toe disease of brassicas; onion, cereal and hop mildews; ergot of rye; cereal and beet rusts; and barley, oat and wheat smuts.

The principal farm insects are large cabbage white butterfly; surface caterpillars; wireworms and millipedes; turnip flea and pea and bean beetles; chafers; grain, turnip gall and bean weevils; frit, gout, Hessian, wheat bulb and cabbage flies; leather-jackets, wheat midge, warble, horse bot and sheep nasal flies; aphides, corn sawfly and eelworms.

The life-histories and remedial measures are given in each case.

On p. 170 the use of gas lime is still advocated against eelworms, although this material is now practically unobtainable!

There are three appendices: "A" gives the date at which potato spraying should commence in the several parts of the country; "B," the Cheshunt compound formula for the control of "damping-off" fungi, but there are no instructions as to the method of using it; and "C" a fuller account of the life-history of the wheat bulb fly.

"Our Butterflies and Moths and How to Know Them." By E. Fitch Daglish. 126 pp.; 34 figs., 18 plates. (Thornton Butterworth, London, 1923.) 6s. net.

This book is "intended as a guide to the young naturalist and collector," and "to enable the reader to recognise all the commoner and more striking forms without technical knowledge."

The subject is treated in such a manner that all scientific designations of the insects and their food plants are carefully avoided.

The author's arrangement is to group the majority of our butterflies and the most conspicuous of our moths according to their respective colours and dimensions.

Each species is briefly described, together with its caterpillar and chrysalis, of which several crude drawings are included in the text. The Privet Hawk Moth caterpillar, p. 67, is an example of crude drawing on account of the misleading position of the "prolegs," and the Ghost Swift caterpillar, p. 73, might represent anything!

The eighteen plates (two in colour) figure 123 species and are extremely good. On Plate XVIII, the moth labelled the Cabbage, *Mamestra brassicae* (described on p. 117), is really the Turnip Moth, *Agrotis segetum*.

This book will prove to be a useful asset to the young collector, although the price appears to be an unreasonably high one for the subject-matter contained therein.

"Vegetable Foes." By T. W. Sanders. iii + 109 pp. 17 col. and 12 monochrome plates; 49 figs. (Collingridge, London, 1922.) 4s. net.

This is a companion volume to "Fruit Foes" (see R.H.S. JOURNAL, 48, p. 141). The outstanding feature for a book of this price is the figures and the plates, which reach a high standard.

The pests and diseases are given under the vegetables attacked, which are placed alphabetically. The life-history of each is concisely described, together with the method of dealing with it. There are several minor errors in the life-histories and scientific names—e.g. the Pea Beetle is correctly named *Bruchus pisi* on p. 64, but *B. pisorum* is the name given on the plate facing p. 68!

Some slight improvement could be made by interchanging some of the plates, so as to bring the figures of the pests nearer the descriptions of them in the text, e.g. the plate facing p. 16 should picture the Beet Fly (plate facing p. 36), instead of the Turnip Sawfly.

Unnecessary repetition of figures is to be deprecated in a book of limited space, as several pests are figured twice in the space of two pages—viz. Beet Carrion Beetle on p. 16, Green-veined White Butterfly on p. 24, and plates facing these pages respectively, etc.

The Chafer figured on p. 25 is incorrectly called the Cockchafer. It is the Rose Chafer, *Cetonia aurata* (compare with figure of Cockchafer on plate facing p. 96).

Contradictory statements occur in two places—viz. (1) the figure on p. 32 showing the rounded forceps of the female Earwig is not consistent with the statement made on p. 31, that the male can always be recognized by the rounder form of the forceps compared with the straighter form of the female; and (2) the statement on p. 86 that hydrocyanic acid gas will kill the eggs of White Fly is flatly contradicted by the correct report of the author's friend on p. 87, as here we read that at least two fumigations are necessary, at an interval, to allow the eggs to hatch, and then to kill the newly-hatched nymphs.

Part 2 deals with (i.) spraying machines and the points to look for in efficient spraying; (ii.) insecticides and fungicides, together with formulæ; and (iii.) soil sterilization.

The methods suggested for soil sterilization—often a necessary operation—are treatment by formalin, ammonia, carbolic acid, steam, dry heat, and lime and sulphur.

This small book is of sufficient merit to be recommended to all growers of vegetables.

The clear description of the many foes that the horticulturist has continually to contend with, and the excellent figures and plates, make recognition of these foes comparatively simple.

This book should have a wide circulation.

"Insect Pests and Fungous Diseases of Farm Crops." By A. Roebuck. 55 pp.; 25 figs. (Messrs. Benn Bros., London, 1923) 2s. net.

This small book is written in an easy and comprehensive style, and should prove a useful handbook to the farmer.

There are three main sections: (i.) Introduction, which deals with such subjects as crop losses through the attacks of insects and fungi; the balance of Nature, and the effect of Man upsetting it; co-operation and immediate action in limiting the extension of disease.

(ii.) Part 1 briefly describes the general features of insects; and such important farm pests as Wireworms, Frit Fly, Flea Beetles, Slugs, Cutworms, Leather-jackets, and Cabbage, Onion and Carrot Flies are dealt with in detail. Their several stages are described, together with the life-history and the necessary preventives or remedies to be used against them.

(iii.) Part 2 deals similarly with the fungous and bacterial diseases of farm crops—e.g. Finger-and-Toe, Potato Black-Leg, Potato Disease and Scabs, and Cereal Smuts and Bunt.

The making of Bordeaux and Burgundy mixtures is clearly described on p. 37. These useful washes are too often incorrectly made, causing damage to the plants and loss of time and labour.

The last part of this section deals with (a) orchard and general farm hygiene—e.g. grease banding, spraying, rotation of crops, clean cultivation, etc.; and (b) soil sickness.

On p. 14 the confusion of Millipedes, Centipedes and Mealworms with Wire worms is pointed out; but the author might have added that the useful carnivorous larvae of Ground Beetles (Carabids) are very often mistaken for Wire-worms, and numbers of them are consequently destroyed.

There are a few errors in the book. On p. 45 *Humuli* is printed *Lumuli*, and on p. 2 it should have been made clear that 1920 was intended by the expression "last year."

"The Forests of India." Vol. II. By E. P. Stebbing, M.A. 8vo. 633 pp. Illustrated. (John Lane, London, 1923.) £2 2s. net.

"The Forests of India" is by far the most intelligent and important contribution that has been compiled with reference to woodlands in any part of the world. India was indeed fortunate in procuring the services of such men as Cleghorn, Brandis, Ribbentrop, and others, in the management of her extensive areas of valuable forest lands. The foundation of forest conservancy in the different provinces of the Indian Empire may be said to have taken place between the years 1857-70. The first volume of "The Forests of India" brought us up to the year 1864, while the present deals mainly with the period between that date and 1870. In a subsequent volume it is proposed, in connexion with the marked progress that has been made both in administrative and professional work, to deal with the years 1901-20. Forest organization and development are almost entirely due to the above-mentioned men, who not only devised but put into working order a methodical system of forest management. The great increase in revenue from the forests during the past twenty years clearly demonstrates that the augmentation of the staff, general reorganization of the work, aided by increased money grants, have all had a telling effect in that particular direction, and should form a precedent for all other forest services of the Empire. The importance of training forest probationers for the Indian service was early recognized by Brandis, who approached the Government of India on the subject. As a result the Secretary of State authorized Brandis to select two gentlemen, well trained in forest management, from Germany and France, as also one from Scotland. The organization and education of the staff of the Department, as related in Chapter XV., but particularly that portion which deals with the progress of forestry education, is particularly interesting reading. Cooper's Hill College, in England, under the able direction of Dr. (afterwards Sir William) Schlich, turned out a large number of foresters, the first lot of whom joined the College in 1885. The protection of the forests from fire, reckless felling of trees, and grazing, was evidently accomplished with considerable difficulty, as the natives looked upon the timber as a perquisite or common property, which they could cut

down or destroy at will. In the formation of plantations and improvement of forest crops it was found that natural regeneration required to be aided by planting young trees, as many of the forests were in a ruined condition, whether from overfelling or the retention of diseased and badly shaped trees. In connexion with Indian timbers it may be of interest to state that since some of these were exhibited in London, at Holland Park, in 1920, they have been utilized in the erection and furnishing of several buildings of note in various parts of the Metropolis. Even the railway companies have, since then, made use of at least three of the woods—padouk, silver-grey wood, and jurgan—in the internal fittings of their carriages. These results can be definitely attributed to participation in an exhibition, and, no doubt, equally good results will follow a well-arranged and properly labelled collection of the available Indian woods at the forthcoming Wembley Empire Exhibition. The present volume runs to 633 pages, and is divided into twenty-one chapters, with a coloured map of the Indian Empire and nearly forty beautifully executed illustrations of forest scenery and works in connexion therewith. There is also a good index and a most useful glossary of Indian words. As with the former volume, which I had the pleasure of reviewing, the writer is to be congratulated on the masterly manner in which he has handled a most difficult and intricate subject, and placed before the reader so vast an amount of interesting information regarding the "Forests of India."—A. D. W.

"A Handbook of the Larger British Fungi." By John Ramsbottom, O.B.E., M.A., F.L.S. 8vo. iv + 222 pp. 141 figures in text. (British Museum, London, 1923.) 7s. 6d.

Mr. Ramsbottom has rewritten and considerably enlarged the original guide of W. G. Smith issued in 1893. The same object which Smith had in view—that is, "to exhibit to the public such a series of edible and poisonous species as would help to prevent the fatal mistakes so often made from eating poisonous fungi"—has been faithfully preserved in the present work. All British genera are now included, and additional figures have been added from the same source as before, viz. Smith's "Synopsis of British Basidiomycetes." Most of the descriptions have been revised and enlarged, and notes have been added to those forms which exhibit points of economic and biological importance.

In his introduction Mr. Ramsbottom deals with 'Fairy Rings,' Luminosity, Mycorrhiza, Change of Colour Poisonous and Edible Fungi, Fungi as Food, and Ecology. Under "Class I Basidiomycetes" is a concise, up-to-date note on their cytology, and under the heading "Order I. Hymenomycetes" appears an account of the general life-history of these forms, including a fairly detailed note on their development.

The symptoms of poisoning produced by various species of *Amanita* are very fully described, and are decidedly gruesome. Excellent accounts are given under the parasitic and wood-destroying forms—*Armillaria mellea*, *Polyporus Schweinitzii*, *P. squamosus*, *P. sulphureus*, *P. betulinus*, *Fomes fomentarius*, *F. ulmarius*, etc.

Dry rot is likewise ably dealt with under *Merulius lacrymans* and *Coniophora puteana*.

The book, written in such a style as to excite the interest of all wishing to become further acquainted with the higher forms of fungi, is to be thoroughly recommended to students and amateurs alike.

"Légumes et Fruits des Cinq Parties du Monde." By R. de Notre. 16mo. 225 + 137 pp. (Gauthier-Villars, Paris, 1923.) 18 fr.

These are lists of plants used more or less in the various countries of the world, with brief notes upon them, of which the following will serve as an example:

"*Hedysarum umbellatum* L.—Amboine—(Fam. des Legumineuses). Les habitants, les plus pauvres de l'île d'Amboine, consomment les feuilles de cette plante en guise de légume."

"Six Great Scientists." By M. Avery. 8vo. ix + 100 pp. (Methuen, London, 1923.)

Brief biographies and appreciations of Pasteur, Lister, Darwin, Wallace, Mendel, and Galton—all biologists—with portraits of each. A very readable account of the lives of six remarkable men.

"Botany of the Living Plant." By F. O. Bower, Sc.D., F.R.S. Ed. 2. 8vo. xii + 634 pp. (Macmillan, London, 1923.) 25s.

Only four years have elapsed since the first edition of this excellent textbook was published. It now appears revised and with sixty additional pages adding to its value (but not to its cost). New chapters on "The Living Cell" and on "Evolution, Homoplasy, Homology, and Analogy" have been interpolated, and a complete change of sequence adopted for the treatment of the part dealing with cryptogams. The general basis of treatment to which the book originally owed its great and special value—the correlation of structure with function—remains unchanged, except for necessary revisions. It is a book which no serious senior student of botany can neglect, and the only improvement we can suggest is that references might be given to important papers dealing with investigations of the matters treated of; but this after all is largely a teacher's business and an earnest student's first step to research.

"Essex County Farmers' Union 1923 Year Book and Report." Ed. by J. B. Gill. (Chelmsford, 1923.) 2s. 6d.

A well-illustrated report containing numerous valuable notes as well as accounts of local doings in agriculture and market-gardening.

"The Flower-Lover's Guide to the Gardens at Hampton Court." By Ernest Law, C.B. 46 pp. 8vo. (Bell, London, 1923.) Paper boards, 2s. net.

This is "an outline of their origin and history, a description of the lay-out, a full account of the bedding, and a list of all the flowers, shrubs, etc., now in them, illustrated with views and plans" of the gardens at Hampton Court.

The idea of the book is good, but apart from the historical introduction and the plans the book is full of errors from beginning to end in punctuation and in plant names. It is to be hoped that the author before he allows the new book to appear which he foreshadows will get a competent proof-reader to go through it for him. Part of the trouble arises from the use of "the plain English names of the flowers [which are] given first, in preference to the foreign, botanical names—too often horrible, made up, modern, mongrel Greco-Latin (*sic*) words—their old English names, on the contrary, having been in use for many hundreds of years and being often associated with some of the most beautiful passages in English poetry."

This is all very well. It is perfectly true that botanical names are often made up and modern, for many plants were unknown until modern times: this is inevitable; and it is also true that botanists have perpetrated horrible mongrel names, but it is equally true that "old English names" are often not old, nor even commonly used. Who to-day speaks of Starworts? Yet the first-named plant on the herbaceous border is called STARWORT ASTER, *Climax* Blue; a little further along is the HEDGEHOG FLOWER; in the next border appears ASTER, *AMELLUS Bessarabicus*. One really familiar with garden plants and good at guessing may usually, perhaps, form an idea of the plant meant, although "Sneezeweed" for *Helenium*, "Rosin Plant" for *Sulphurum*, "Groundsel" for *Senecio Doria*, "Milk-foil" for *Achillea sibirica*, "Chalk plant" for *Gypsophila paniculata*, are none of them *old* English names for these plants, though they may be for congeners. As for misspellings, we have not found a page upon which they do not abound. E.g., among other errors, we find on p. 38, "Alpine Rhododendrons Irroratum, R. Williams, Yunnaneuse"; a little lower down "Michaelmas Daisies" (this time), "Nimineus Perfectus, Ptarmicoides"; and on the same page Delphiniums "Yvette Guilbert, Rev. J. Stubs, Mrs. Crighton, Lamartin"!

NOTES AND ABSTRACTS.

[For Index of Periodicals quoted see previous volumes.]

Apple Sucker, Experiment in the Control of the. By W. H. Brittain (*Jour. Pomology*, vol. iii, No. 2, April 1923, pp. 106-112).—An attempt was made to control *Psylla mali* adults by open-air fumigation with tobacco waste. A series of experiments were made, using (1) tobacco stems, (2) spoiled leaf tobacco, and (iii.) dust. The most effective control was attained by the use of 360 lb. of waste tobacco to the acre. Numerous small heaps—damped to prevent them blazing up—were made in the orchards, and fired by means of a torch.

Success can only be hoped for in isolated orchards or where all orchards in the district are dealt with, and the operation must be performed as late as possible before oviposition in order to prevent reinfestation.—*G. F. W.*

Black-Currant Mite, A Note on the Effect of Sulphur on. By A. H. Lees (*Jour. Pomology*, vol. iii, No. 2, April 1923, pp. 103-105).—An investigation, under laboratory conditions, of the effect of sulphur on migrating black-currant mites.

The forms of sulphur tried comprised a sulphur cloud and lime-sulphur. The former appeared to be most effective but as yet no method has been devised for its use under open-air and commercial conditions.—*G. F. W.*

"Cutworms," Notes on the Control of, by Poisoned Bait. By J. C. F. Fryer and R. Stenton (*Ann. App. Biol.*, x, No. 2, July 1923, pp. 241-252; 3 figs.).—A detailed description of laboratory and field experiments in controlling the larvae of the turnip moth, *Euzoa setigera*.

Results obtained show that the bran bait method is fairly effective in the case of mangold and swede fields, one dressing accounting for 45 per cent. mortality. Moist bran appeared to be eaten as readily as the natural food.

In field experiments, 1 lb. of Paris Green was used to the acre, whereas in America $\frac{1}{2}$ lb. an acre is considered sufficient.

The bait was made of 1 oz. of Paris Green to 1 lb. of bran, dyed with cochineal in order to distinguish the larvae which had eaten it.

The future of this bait method under practical conditions is uncertain, on account of the danger of poisoning poultry and game which might feed on the bran or poisoned larvae.

It is desirable that a poison should be found which would be sufficiently toxic to the larvae without proving harmful to bird and other vertebrates.

G. F. W.

Derris elliptica (Tuba root), A Quantitative Study of the Insecticidal Properties of. By J. C. F. Fryer, R. Stenton, F. Tattersfield, and W. A. Roach (*Ann. App. Biol.*, x, No. 1, Feb. 1923, pp. 18-34; 3 diagrams, 7 tables).—An investigation into the toxic principle of derris root against silkworms and the larvae of the cabbage white butterfly, lackey, bufal-tip, and tomato moths, gooseberry sawfly and another species of sawfly.

Each caterpillar was dipped into the liquid for ten seconds, but the results were disappointing from a biological standpoint, although, taken quantitatively, the results are fairly accurate.

The results of the experiments are clearly shown in tabular form.

Against Aphides the results were disappointing on account of the slow and uncertain action of the poison, whereas nicotine oleate, containing a low percentage of nicotine, was quick and effective.

Emulsions prepared from the fresh root, by maceration with water, appear to be more toxic than the pure products.—*G. F. W.*

Derris elliptica (Tuba root), The Chemical Properties of. By F. Tattersfield and W. A. Roach (*Ann. App. Biol.*, x, No. 1, Feb. 1923, pp. 1-17; 1 fig.).—An outline of the botanical history and an investigation of the constituents of derris root.

The principal constituents are (1) a white crystalline derivative called "tubatoxin" and (2) resins identical with "derride" of Sillevoldt and "tubain" of Wray.

The poisons from the root are readily extracted by means of organic solvents, and 95 per cent. alcohol, benzene, ether or carbon tetrachloride will extract both the toxic and non-toxic derivatives.

The means of chemically evaluating the root extracts are given, together with the method of confirming the genuineness of the results obtained.

The amounts of non-toxic constituents appear to be valuable as emulsifying and wetting agents, although the variation of amounts in different consignments is great.

The root is imported into the British Isles in a dried state.—G. F. W.

Douglas Fir Chermes, The (*Chermes cooleyi* Gillette). (*Forestry Comm. Bull.*, No. 4, 1922, pp. 4-50; 12 figs., 9 plates).—A very complete treatise on the well-known pest of Douglas firs.

Chapter I. describes the general characters of the family, the several life-cycle stages and the genus Gillettia, which includes Chermes.

In Chapter II. the occurrence and distribution of *C. cooleyi* in America and Britain are given, together with the detailed life-history and mode of dispersal.

This pest is dispersed from Douglas fir to Sitka spruce, and vice versa, by the winged adults flying from tree to tree; by nursery stock; wind, birds, and insects.

Chapter III. describes the sexual generations in the Chermesidae, and Chapter IV. the relation of this species to the forest, and types of injury to the secondary host trees.

The last chapter deals with control measures by natural enemies, and artificial control in plantations, nurseries, parks and gardens by dipping, spraying, or fumigating.

The most successful washes were nicotine and soap and paraffin emulsion.

A bibliography of thirty-six references is included. The appendix records (1) seasonal stages in the life-history of this pest in Britain and (2) morphological and biological keys to the genera and species.

The excellent figures of the several stages accompanying the descriptions make recognition comparatively simple.—G. F. W.

Grasshopper, The Greenhouse. By F. A. Mason (*Bureau of Bio-Technology, Bull.*, No. 8, Jan. 1923, pp. 262-267; 4 figs.).—The occurrence of *Tachycines asynamorus* Adel. in Britain is recorded.

This new pest has already been found damaging tomatoes and lobelias growing under glass in S.W. London.

The adult is described and figured, and the life-history dealt with.

Being a nocturnal feeder, this pest may be easily overlooked, but measures should at once be taken when its presence is detected, on account of the damage it does in a short time.

A list of food plants includes young shoots of begonia, cyclamen, petunia, nicotiana, gloxinia, chrysanthemum, pyrethrum and cucumber.—G. F. W.

Light Trap for Insects, A New Type of. By C. B. Williams (*Egyptian Min. Agr. Tech. and Scien. Bull.*, No. 28, 2 pp.; 2 plates).—A description and diagram are given of a portable and successful light trap, which may be used with electricity or acetylene gas, and resembles a miniature light-house. The various dimensions are given, together with instructions as to the manufacture.

The trapped insects are quickly stupefied by the vapour of carbon tetrachloride, by which means the captures are in a good condition for subsequent identification.—G. F. W.

Nicotine Dust as an Insecticide, The Preparation of. By R. E. Smith (*U.S.A. Exp. Sta., California, Bull.* 336, Nov. 1921, pp. 261-274).—This investigation was undertaken in order to find a substitute for liquid spraying where such spraying is ineffective or impracticable.

The experiments and method of application are explained in detail.

Nicotine dust acts as a fumigant, insects being poisoned by the vapour given off. The best results are obtained by the use of a dust of such a nature that the nicotine will be as volatile and quick-acting as possible.

Nicotine sulphate and hydrated lime, which together form sulphate of lime and give off free nicotine and ammonia, gave good results.

The best materials for mixing with the active ingredient of the dust are explained as to fineness, weight, dryness, and absorptiveness.

Materials tried were kaolin, hydrated lime, quicklime, lime carbonate, gypsum, kieselguhr, talc, sulphur, and tobacco dust.

Other considerations are temperature, dusting machines, etc. Promising results were obtained on the following insects—aphides, 8 spp.; leaf hoppers, 2 spp.; bugs, 3 spp.; thrips, 3 spp.; butterfly larvae, 2 spp.; and moth larvae, 4 spp.—G. F. W.

Onion Fly, Control of the. By K. M. Smith (*Bull. Chamb. Hort.*, vol. i. Pt. 3, Jan. 1923, pp. 54-55).—An account is given of the results obtained during 1920-21 against *Hylemyia antiqua*. A more satisfactory medium than sand was found for distributing the various chemicals by the use of precipitated chalk, at the rate of 1 part by weight of the chemical to 99 parts of chalk.

The results of the various methods tried are detailed, also the weight of bulbs on each plot, method of applying the chemicals, varieties with partial resistance to attack, etc.

A summary of results concludes the paper. The recommendations are (1) to stimulate the plants by using an artificial manure; (2) avoid using fresh manure; (3) apply one of the following substances in early spring when the onions are very young, and repeat at intervals of two to three weeks: (a) green tar oil, (b) chlorcresylic acid, (c) nitrobenzene, or (d) cresylic acid, all to be used at the rate of 1 part to 99 parts of precipitated chalk, or (e) paraffin emulsion; and (4) rotation of crops.—G. F. W.

Potatos: Line Selection Work with. By O. B. Whipple (*Jour. Agr. Res.* 19, p. 543; Sept. 1920).—The work of which an account is given had for its object the improvement of potato seed by selection of progeny of high yielding plants within a variety. The full details of the experiments are given, and the author concludes that these results do not furnish very strong evidence of the presence of high-yielding strains within the population of the varieties (3) studied. This is the conclusion arrived at also at Wisley after continued tests. The author believes that selection by "vine development" (i.e. haulm characteristics) would yield better results than are obtained by selection on weight of produce. This would lead to the elimination of "degenerates." A method of selecting seed parents along these lines is described.—F. J. C.

Potatos: The Causative Organism of Skin Spot of. By W. A. Millard and S. Burr (*Kew Bulletin*, 1923, pp. 273-287; Aug. 1923; plates).—The conclusions come to by Shapovalov are examined, and the theory that skin spot is a stage of corky scab is found to be untenable. The organism causing corky scab is found to be *Oospora pustulans*, as concluded by Miss Owen, and now confirmed by further inoculation experiments. The organism develops best at low temperatures, and the trouble appears to be rare in America, if indeed it occurs at all.—F. J. C.

Red Plant in Strawberries and its Correlation with "Cauliflower Disease." By E. Ballard and G. S. Peren (*Jour. Pomology*, vol. iii. No. 3, Sept. 1923, pp. 142-147; 7 figs.).—The diagnostic characters of "Red Plant" in strawberry 'Royal Sovereign' are minutely described. The correlation and connecting characters between this disease and "Cauliflower Disease" are given.

Both these diseases are attributed to the eelworm, *Aphelechus fragariae* Ritz.-Bos, as different responses to the attack of the same pathogenic organism. Fifty varieties have been examined, and none was immune to "Red Plant."

Apparently "redness" is not an invariable character of this disease, as it was found that several varieties, including 'Royal Sovereign,' were attacked without showing any characteristic colour.—G. F. W.

Turnip Gall Weevil (*Ceutorhynchus pleurostigma* Marsh), The. By P. V. Isaac (*Ann. App. Biol.* x. No. 2, July 1923, pp. 151-193; 31 figs., 3 plates).—This paper is divided into three parts: (i.) Life-history and bionomics (pp. 151-170), (ii.) larval anatomy (pp. 171-189), and (iii.) control (pp. 190-193).

The first part deals with the history and distribution of *Ceutorhynchus pleurostigma*, together with its host plants, economic importance, bionomics, hibernation, life cycle, seasonal appearance, dissemination, natural enemies, and descriptions of the egg, larval, pupal, and adult stages. The present investigation showed that this species attacks cabbage, kale, cauliflower, broccoli, brussels sprouts, turnip, swede, and charlock.

Two distinct races occur, a spring generation which breeds in charlock and a summer race which breeds in cultivated crucifers.

The eggs of the summer race are laid towards the end of August, the larvæ remaining in the galls all the winter, pupating in spring and emerging as adults in early June. Natural enemies include the common slug, *Limax maxima*, certain birds (not specified), a Hydrophilid beetle and a Braconid parasite.

The second part of the paper gives detailed accounts of the external and internal anatomies of the larva. The final section is devoted to control measures, which are (1) to root out all over-wintered attacked stalks by the beginning of March, shaking off all soil from the roots, and stacking them up in large heaps and, when dry, burning them; (2) to plough deeply land after removing infested crop in order to destroy cocoons containing pupæ; (3) to avoid growing a crop liable to attack on infested land in the next autumn, although such a crop may be safely grown in spring or early summer; and (4) to destroy such cruciferous weeds as charlock (*Sinapis arvensis*) and hedge mustard (*Sisymbrium officinale*).—G. F. W.

Woolly Aphids, The Immunity of Apple Stocks from Attacks of. By L. N. Staniland (*Jour. Pomology*, vol. iii. No. 2, April 1923, pp. 85–95).—This paper deals with the relative resistance of various root stocks to the attacks of Woolly Aphids, *Eriosoma lanigera* Hausmann.

Complete immunity is very rare.

Artificial infections were made above and below ground.

Four series of stocks were tested: (1) Paradise, 16 types; (2) seedling "free," raised from cider apple pips; (3) "Crab" or "Wilding" vegetative; and (4) 'Northern Spy,' 'Winter Majetin,' and other named varieties reputed to be highly resistant to attack.

Amongst the true types of so-called "Paradise" and seedling "free" stocks, none is immune, although there are marked degrees of resistance both above and below ground.

In the case of "Wilding" Crabs, immune and highly susceptible forms are to be found.

'Northern Spy' and 'Winter Majetin' are immune, both root and branch (under English conditions). 'Majetin' was found to be capable of retaining its immunity when worked on a susceptible root, e.g. Doucin Amelioré Type 5.

G. F. W.

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THE VALUE OF THE MODERN DAHLIA FOR THE GARDEN
AND FOR CUTTING.

By A. J. COBB, A.U.C.R.

[Read February 26, 1924; Mr. W. CUTHBERTSON, J.P., V.M.H., in the Chair.]

IT is not necessary for me to trace the history and development of the Dahlia from its earlier days to the present time. But I should like to draw the attention of anyone interested to the very excellent paper read by Mr. ERNEST KRELAGE of Haarlem, at the International Horticultural Congress held at Amsterdam in September last year, and printed in the *Gardeners' Chronicle* for October 6 and 13, 1923.

While it is not necessary for me to trace the history of the Dahlia, it is permissible, and perhaps necessary, to allude to the old-time Dahlia and contrast it with the Dahlia of to-day.

It is not a new point by any means. It is one which has been laboured by many speakers and writers; but despite all that has been said, written and done to convince the public that the modern Dahlia is pre-eminently a plant for the garden and for cutting it is astonishing how slow even garden lovers are to realize that fact to the full.

It is passing strange that we in England, who are second to none in our love of gardening, should lag behind other nations in our appreciation of this fine old flower. Our horticultural journalists who visited the Amsterdam Conference and Exhibition last year gave striking

accounts in the English horticultural papers of the popularity of the Dahlia in Holland.

One report was as follows :

" Using the term in its broadest sense, it is not too much to state that the 'decorative' Dahlias are at the moment the most popular and fashionable flowers in Holland."

They were to be seen everywhere—in the shop windows of clothiers, hardware dealers, drapers, photographers, and others, in the rooms and windows of private dwellings, in hotels and restaurants, in the markets, florists' shops, on the street-sellers' ornamental barrows, in parks and in gardens.

Another report stated that the outstanding floral feature which presented itself was the wonderful way in which the Dahlia had captured the Dutch people. In the United States of America, too, one hears that Dahlias are immensely popular, not only as garden plants but for cutting purposes also, and that the most fashionable shops of the Fifth Avenue, New York, use them lavishly, and for a period the Dahlia monopolizes the market.

One naturally asks oneself, why are we behind others in our appreciation of the value of modern Dahlias? Is it a question of taste or fashion? I think not, but rather one of sentiment and conservatism. I fear many still regard Dahlias as exhibition flowers only, or as unsuited for the garden. The sight of a good modern collection would probably be a revelation to them, and would, I venture to say, convert most people to Dahlias.

To emphasize their claims, I will first enumerate a few of the criticisms one hears levelled against them.

1. Dahlias flower so late in the season, and no sooner are they in full bloom than the first frost cuts them down.
2. Dahlias take up too much room in my small garden.
3. The flowers hang their heads, and are no good as cut flowers.
4. They require a lot of attention and manure, and these cannot be given.
5. They have no scent.

Let me now examine these criticisms. In a court of law, proof is generally needed to procure conviction. I think I can prove that most of these criticisms are groundless. To take them in their order :

1. Dahlias flower so late in the season, and no sooner are they in full bloom than the first frost cuts them down.

To that I would reply, I doubt if any flower can be named that will bloom continuously over a longer period.

It is not now necessary to look upon the Dahlia solely as an autumn flower. It is quite easy to have plants in bloom by the end of July and even earlier, if the plants are grown for the purpose.

Many of the dwarf bedding varieties will bloom quite as early as the average bedding plant. To obtain this early blooming, good strong plants must be put out at the end of May and choice given to those varieties which are known to be early bloomers. Many of the modern types have this quality, and it is not confined to any one type, but varies with varieties. Generally it will be found that early bloomers produce less foliage than the later ones, and, what is of great importance, frequently more flowers at one time.

It will be noticed that I used the words "will bloom continuously"—that is where the Dahlia differs advantageously from many other flowers. As soon as it commences to bloom, no matter how early, there never was a season, I venture to say, when it did not go on flowering freely until cut down by frost, always providing it had sufficient water and that faded blooms were regularly picked off. Masses of blooms are produced, and it is no exaggeration to say that as many as thirty to forty blooms can be cut off some varieties every week, and the more you cut the more the plants grow and flower. I have cut flowers at the end of May and the same plants continued to bloom till November.

I am well aware that in some parts of the country this late period of blooming would probably never be realized, but in the more favoured parts of the south and west it is very seldom that the Dahlia is cut down by frost before mid-October. I only remember one exception, when they were very badly damaged on October 7. Last year it was early in November, and in 1922, October 27. More often than not the same frost that destroys the Dahlia also finishes the Chrysanthemum and other plants.

Strangely enough, little or no notice is taken of the ending of the Chrysanthemums or the few remaining occupants in flower in the herbaceous border, but the blackened Dahlia foliage which the day before looked so healthy and supported a quantity of gay flowers brings with it sighs of regret. That, I think, answers objection number one.

To take the second objection :

2. Dahlias take up too much room in my small garden.

That remark might have been justified at one time, but it is not so now. Types are now obtainable which take up no more room than a bedding Pelargonium.

It is quite true that a good thing in the wrong place becomes a bad thing, and fine as some of the larger and tall growing Pæony-flowered and giant decoratives may be when growing, say, in Hyde Park or in bold herbaceous borders backed by a high wall or a hedge, obviously they cannot be entertained in the small garden. But the great diversity of habit of the different types, ranging as they do from 1 foot to 7 feet in height, makes it possible to choose suitable types and varieties which will not take up an undue share of the limited space of a small garden.

Here I would like to draw attention to the revised classification of the Dahlia. Owing to the introduction of the modern Dahlias, a new classification was deemed imperative so as to assist the public to become familiar with them, and to enable trade growers to have a standardized system of cataloguing. The older types were classified under Cactus—show and fancy, pompon, single and anemone. The coming of the decorative, Paeony-flowered, collarette, star, dwarf bedding Cactus, Camellia and others tended to confuse matters. To rectify this a Conference took place in the Royal Horticultural Society's Gardens at Wisley in the Dahlia season of 1921, and, after fully discussing the matter, a joint committee of the R.H.S. and N.D.S. decided upon a classification. This will be found clearly set out and illustrated with typical examples of blooms in this volume of the JOURNAL of the R.H.S., p. 50. It will also be printed in this year's schedule of the N.D. Society's Show with some slight amendments.

I attach great importance to this classification from the point of view of popularizing the Dahlia, as it will be found to provide a reliable guide to the characteristics of the plants and flowers in each group. To be of full benefit to the public, the trade grower should endeavour to adhere to it as closely as possible. At the same time, with a flower so varied as the Dahlia, it is not possible or desirable to conform to a rigid rule.

By this means—and with the assistance of directors and superintendents of public parks and gardens, and the trade growers whom I would respectfully ask, if they are not in the habit of doing so, to clearly label their plants not only with the varietal name but the type also—the public would soon get familiar with the types, and be thus able to order plants from catalogues without fear of possible disappointment.

It is remarkable how tastes differ in regard to the types. This is very noticeable at shows, where you will perhaps hear one person clearly expressing a preference for the Paeony-flowered type over the decorative; another fancies the collarette; while close by possibly comments are being made on the collarette the reverse of complimentary. However, all tastes can be provided for, and this will be simplified when the types are better known. I will presently show on the screen illustrations of most of the types.

To turn to the next criticism :

3. The flowers hang their heads, and are no good as cut flowers.

This idea has, of course, long since been exploded. It is perfectly true that most of the old types did hang their heads or had short stalks and the flowers hid themselves shyly under the foliage. Such flowers were of course of little use for cutting, but as many of them were very beautiful individually they were at one time very popular as exhibition flowers. When, however, it became apparent that the flower was rapidly declining in popularity owing to the faults

mentioned, raisers at home and abroad turned their attention to evolving types more suitable for the garden and for cutting.

As was perhaps only to be expected, the ideal was not attained at once. The genuine intention, however, of raisers to obtain a sturdier race of plants which would combine freedom of flowering with rigidity and length of stem is now fully realized. How well their efforts have been rewarded was plainly seen at the trials of new Dahlias held at the R.H.S. Gardens, Wisley, during the past three years.

For those unacquainted with the conditions of the trial, I will just mention that new varieties are shown as cut flowers before a joint committee of the R.H.S. and N.D.S. at the Horticultural Hall, and if the blooms show evident signs of making a first-rate garden plant (and it may be taken that a garden plant also provides excellent flowers for cutting), the variety, if receiving sufficient votes, is selected for trial at Wisley.

I think these trials bore conclusive proof of not only how well the selection committee had done their work, but also that raisers before submitting their novelties for critical examination had considerable confidence in the varieties being able to bear the still more crucial tests when inspected and judged upon while growing at Wisley.

A glance down the list in the R.H.S. JOURNAL of plants sent for trial, with a brief description of each variety, will show that even the plants which did not come up to the standard set by the judges for an A.M. or H.C. were practically all described as "free" or "very free with flowers on erect stalks." The judges rightly set a very high standard for an A.M.

I feel, therefore, that anyone who has had the privilege of seeing the Dahlias at Wisley, or who may have seen a good modern collection elsewhere, will agree that it is not now necessary to grow Dahlias with a poor garden habit.

Now what about the cutting?

The fact of many of them having stalks 10 to 15 inches long, and the option of cutting a much longer stem by sacrificing growth, proves that, as far as length of stalk is concerned, their suitability cannot be disputed.

I mentioned earlier the popularity of the Dahlia in Holland and America as a cut flower. If the test for a commercial cut flower is as high in those countries as it is here, then the fact of shop windows being filled with it is convincing proof of its merits. Popular taste there appears to be in the direction of the giant decorative, but probably the explanation is that the flowers of this type stand packing and transit better than the open-eyed types, such as the Paeony-flowered.

The giant decoratives are particularly useful for bold vases in large rooms and halls, and look best when arranged with suitable ornamental hardy foliage.

The Paeony-flowered type probably lasts quite as well when cut

for home purposes, and the effect of unordered elegance when these large flowers are arranged with suitable grasses and such cut foliage as *Prunus Pissardi*, *Acer Negundo*, and *Taxodium distichum* is perhaps better than that obtained by the more formal decoratives.

Many of the daintier forms are excellent for cutting and suitable for both room and table decorations.

The miniature Paeony-flowered and miniature decoratives are excellent for the former purpose. They last on an average four to five days and frequently much longer, and as the flowers are produced with great freedom a few plants will provide hundreds of blooms during the season.

The Stars have now quite a reputation as cut flowers. Their stalks are everything to be desired, and the size and shape of bloom ideal for table decorations and other purposes.

Singles are very charming, but it cannot be claimed for them that they last well when cut.

The Collerettes are much better; why, it is difficult quite to understand, unless it is that the inner row of ray florets which give the type its name have the power of holding the florets on longer than the singles.

In every case it is of great importance to cut the flowers in a young state just before the first or outer row of anthers bursts. If left later it simply means that the time between the bursting of the first anthers and cutting has to be deducted from the lasting period when cut. The cutting should be done either in early morning or evening, and the stems for a few hours at least put deeply in water. I have heard that it adds to their lasting properties if, when cut, the stems are immersed in warm water, but I have not definitely proved this.

Now to come to the fourth objection:

4. They require a lot of attention and manure, and these cannot be given.

What a mistaken idea! In proportion to the return they give, no flowers give so little trouble. If we take the period of attention from the time of propagation to the time of planting out in its flowering quarters, the Dahlia does not give a scrap more work than other plants raised under glass for the same purpose. The attention from that time onwards is no more than that required by many herbaceous plants. One good stake to which the plant is tied and the side growths looped to it is frequently all that is necessary and is all I have given to thousands of plants. Very strong growers in exposed positions may require three, but I object to seeing a lot of unsightly stakes, which the plants do not really require, and which detract considerably from their beauty.

As to the manure, there can be no greater fallacy than to assume that Dahlias require a lot of farmyard manure. The use of much of this will always defeat the aim in view, that of providing a plant

with a moderate amount of foliage and a quantity of bloom. I am glad to note in this connexion that the ground on which the trials were grown at Wisley last year was not manured, but was well dug and frequently hoed. The vigour of the plants proved that manure was unnecessary.

The Dahlia will grow in all sorts of soils, from light to heavy, though it really enjoys a good medium loam. In a very light soil, I would not say that I would never manure, but, if I did, it would be in moderation. A small amount of bone meal, worked into the soil before planting, is most beneficial, and as the plants commence to flower some liquid manure watering would help them.

What the Dahlia really does want, and must have to do well, is plenty of water. This, I feel sure, is the most important point in its culture. But as an instance of the behaviour of the Dahlia in spells of drought, it never becomes unsightly, as many plants do, by losing its bottom foliage, but remains green and healthy and ready to grow freely as soon as rain comes. Hot spells and drought merely delay blooming, but never, as far as I know, do any permanent injury.

To take the last objection :

5. The Dahlia has no scent.

To that, in the name of the Dahlia, I plead guilty. One cannot get the better of an argument by overlooking an opponent's point of view. As, however, so much has been done to bring about the evolution of the Dahlia, the search for this mysterious something we call scent is a goal which raisers might well keep in view. Though usually an optimist, I am afraid in this instance I cannot see much hope of its fulfilment.

Having answered these oft-heard criticisms, I hope convincingly, is there anything more to be said in its favour ?

Yes, I have a few more strong arguments I can bring forward.

Firstly, I would like to refer to the Dahlia as a town or city flower. Anyone who has attempted to do gardening in the heart of a city knows full well that there are far more flowers that fail than succeed. From observation and from information obtained from those best able to know, it is unanswerable that the Dahlia has few equals and possibly no superior as a town plant.

I cannot, I think, do better than read to you the following answers which Mr. Hay of Hyde Park very kindly gave me in response to questions of mine in connexion with the Dahlia as a London Park plant.

1. What has been your experience of the Dahlia as a flower for London ? How does it compare with other popular flowers for park work ?

Answer.—I know of no plant that is so much admired by the park frequenter as the Dahlia. The border should have a big collection and all named. Beds of one sort do not give the same pleasure,

however effective they may be. It is the endless variety that is the charm.

2. What do you consider to be the opinion of the public on the Dahlia?

Answer.—The public are fast appreciating the fact that as a town or city plant the Dahlia is without a rival. When we get Dahlias that will flower a month or six weeks earlier than the present race they will supersede many plants now used in cities.

3. Have they any preference for any one type?

Answer.—I am forced to the conclusion that the Cactus forms are most admired, at least I am often told there should be more in the collection, but, as you know, the number of those that are effective as garden plants are very few, although they are improving.

You will admit that these answers speak strongly in favour of the Dahlia.

Many of you are doubtless aware of the magnificent display of Dahlias which Mr. Hay provided in Hyde Park last year. He has given the London public a fine show of them for many years, and has increased the number of plants annually as public taste for them demanded. This year we may expect a still larger display, and this will give our American and Dutch visitors and others, who will no doubt be coming over for the Empire Exhibition, a chance of seeing that, at any rate, the metropolis is alive to the great possibilities of the Dahlia as a decorative plant.

I now wish to make a few comments on some of the types.

It will have been noticed that Mr. Hay is of opinion that the public have a leaning for the Cactus type. Well, no one can, I think, deny the claims of flowers of this type to beauty, but, unfortunately, they are more damaged by bad weather than any type I know, especially those with thin florets. Their old fault of short and weak stems our raisers are gradually overcoming, and in a few years it is probable that lovers of this section will have plenty to choose from which will comply with the standard set for a garden Dahlia.

The giant decoratives and Paeony-flowered, so suitable for large gardens and parks and for bold cut-flower schemes, have all been improved in habit of recent years.

Of the collarettes, I think there is little to add to the praise I gave when lecturing in 1913 at the N.D.S. Conference. I could not then see how they could be much improved, and so far I have not noted any great advancement except in the wide range of colouring.

Considerable advance has been made since that time in other directions—in the raising of suitable types for the garden and for cutting—I think the greatest advance in the history of the Dahlia.

We have had during the last twelve years the stars, miniature Paeony-flowered, miniature decorative, Camellia, and improved singles. Most of them are earlier flowering than the older types, and all are



FIG. 27.—INDO MALAYAN JUNGLE ON THE WESTERN BRANCH OF
THE IRRAWADDY.

{ To face p. 146.

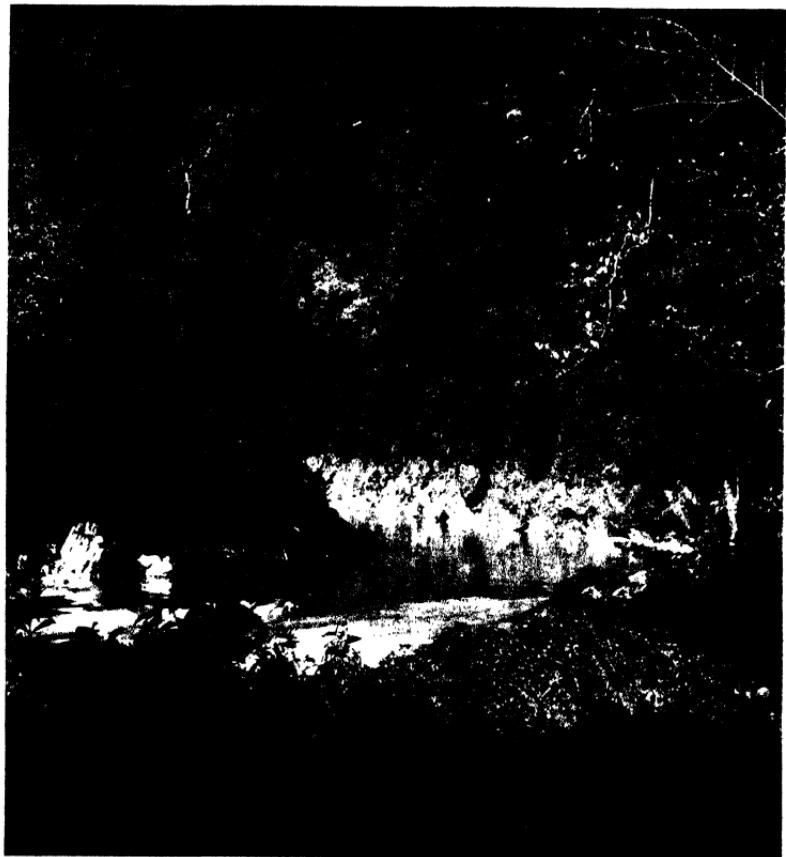


FIG. 28.—THE NAM TAMAII, HEADWATERS OF THE IRRAWADDY

FIG. 29.—Walls and Platform Above the Eastern Terracotta Room (Pl. 11).





FIG. 30.—REST HOUSE ON ROAD TO MAW BWE THE 'NMAI KHA OR EASTERN BRANCH OF THE IRRAWADDY.

[To face p. 147.]

eminently suitable for the garden, and especially where larger plants and blooms are not altogether desired.

With the possible exception of the Camellia-flowered type, which may be too formal for some tastes, they are all ideal for house and dinner-table decorations, the stars being especially dainty for the latter purpose, and have good lasting qualities and a wonderful range of colouring. As to their particular uses in the garden, they are wide and varied from that of a formal bedding scheme to a place in the wild garden. For bedding, which is one of the forms of gardening that has undergone changes as fashion and taste have decreed, I consider many of them ideal. For beds where it is not desired to have plants above 18 inches to 2 feet in height, the Mignon and other dwarf singles and the dwarf bedding Cactus are the best. For rather bolder beds many of the dwarf decoratives, miniature decoratives, and miniature Paeony-flowered varieties will be found perfect.

All these can, if necessary, be arranged with other suitable plants, either as a carpet, mixture or edging.

For borders of any size, all types of the flower are admirably suited, and they can be arranged as individual tastes warrant.

Possibly Dahlias are never seen to such wonderful effect as when a portion of a garden is set apart for them. Massed in such a place with suitable surroundings, such as Shrubs, Bamboos, or Wichuriana Roses, the effect has to be seen to be realized, and if the garden is in a depression and can be viewed from above so much the better.

But the particular part of the garden which will perhaps lend itself to the greater number is the herbaceous border. Most gardens, large or small, have their herbaceous borders, and it is here that the Dahlias can be used effectively, even if no other part provides a site. Rich as we are in herbaceous plants, there are certain periods during which the border lacks colour and distinction, and this is most apparent after July. There are plenty of bronzes and yellows, but where do we get the crimsons, scarlets, and pinks, and the delightful shades of salmon and apricot, such as we find in Dahlias? All the types are suitable, and if used with judgment as to height, numbers and colour, they will give colour and character which many herbaceous borders often lack.

As one having the prosperity of the Dahlia at heart, I hope that I have made it quite clear that there is not a garden, large or small, the charm of which could not be enhanced by the addition of well-chosen types.

THE FLORA OF THE UPPER IRRAWADDY.

By F. KINGDON WARD.

A THOUSAND miles up the Irrawaddy the Burma railway ends at Myitkyina. Then, forty miles on, the Irrawaddy splits into two great branches—the Mali kha or western branch, and the 'Nmai kha or eastern branch, both flowing from the north and both unnavigable. From the confluence to the sources of the 'Nmai kha it is, in an air line, about 250 miles ; and the total area drained by the two branches is, in round numbers, 25,000 square miles.

The whole of this great region, made more vast by ranges of lofty mountains, is covered with dense forest. In the low-lying regions and in the deep valleys the forest is of Indo-Malayan affinity ; but on the high mountains of the China frontier it is Himalayan and Chinese—though only Chinese in that the same type of vegetation extends far into Western Yunnan. Northwards again it becomes more Himalayan—a mixture of endemic, north temperate, Indo-Malayan and east Asiatic genera and species.

My travels in the basin of the Upper Irrawaddy extend to the headwater streams of the 'Nmai kha on the east, and almost to the sources of the Mali kha on the west ; and the following notes on the flora deal more particularly with the district known as the Htawgaw Hills (including Hpimaw, Imaw Bum, and other places mentioned in dispatches), the plain of Hkamti Long (on the Upper Mali kha), and the mountains enclosing the Taron River.

As already stated, the whole region is forest clad, so much so that there is practically no other formation worth considering. But since the mountains on the China frontier, and again towards the headwaters of the Irrawaddy, rise above the tree line, we must take notice of an alpine region.

The forest belt may conveniently be subdivided into three : (i) Indo-Malayan Jungle, up to 4,000 feet ; (ii) Temperate Rain Forest, 4,000–8,000 feet ; (iii) Conifer and Rhododendron Forest, 8,000–12,000 feet. Above 12,000 feet we come first to dense thickets of a dwarf bamboo, and finally to open alps covered with typical alpine flowers.

(i) Indo-Malayan Jungle fills all the deeper valleys of both main branches of the river, and also of their tributaries, at least as far north as the 28th parallel. There is, of course, a gradual falling off in tropical species, but the northward extension of the Indo-Malayan flora—especially forest flora—proves how much more important is rainfall than mean temperature, so long as the rainfall is well distributed throughout the year. In this respect the climate of the Upper Irrawaddy basin resembles that of the equatorial region

rather than that of Lower Burma with its pronounced dry season; consequently the forest is more evergreen and less of the monsoon type, though a short "cold weather," to some extent, takes the place of, and has the same effect as, the "hot weather" of Lower Burma.

This Irrawaddy jungle then is characterized by a great variety of trees belonging to typical Indo-Malayan families. The following may be noted: many figs, including *Ficus elastica*, *F. cunia*, and, in the rocky river beds mingled with *Rhododendron indicum*, the little shrubby *F. pyriformis*, forming thickets; the erect fruits of the last resemble the capsules of certain species of *Rhododendron*; species of *Elaeocarpus*—in full bloom a beautiful sight, covered all over with little white bell-heather flowers with frilled edge—*Garcinia*, *Pterospermum*, *Engelhardtia*, which in fruit resembles a weeping hornbeam, *Illicium*, *Eugenia*, *Myristica*, *Bauhinia*, *Dipterocarpus*, *Acacia*, *Bombax*, the Indo-Malayan plum *Parinarium* with fruits of cast-iron hardness, *Pandanus*, tree ferns, and several big palm-like *Araliaceae*; certain palms, including the climbing palm *Calamus*, the sago-palm *Caryota*, *Areca*, and *Borassus*—the last two planted; many bamboos, plantain (*Musa paradisiaca*); woody climbers, such as *Entada*, with its heavy thirty-inch pods and big, hard, polished seeds, *Ventilago*, *Securidaca*, *Sphaenodesma* and *Hiptage*, all with spinning fruits, *Tripterygium Forrestii*, *Mussaenda*, and the vile *Mucuna pruriens*, purple-flowered, stinking, and a cause of great irritation when touched; and finally shrubs—species of fragrant pink-flowered *Luculia* (probably *L. gratissima*, or indistinguishable from it), and sweet-scented jasmine, *Phlogacanthus*, *Elaeagnus*, *Clerodendron*, *Vernonia*, *Rubus*, *Citrus*, *Osbeckia*, *Oxyspora*, *Lantana*, etc. (fig. 27).

Many of the big trees are loaded with epiphytic orchids, species of *Agapetes*, *Aeschynanthus*, *Lysionotus* (as *L. Wardii*), ferns, and even *Zingiberaceae*, such as *Hedychium*; in the wettest forests, the leaves of the trees are covered with epiphyllous lichens and moss.

In the undergrowth are ground orchids, undershrubs, and numerous species of *Strobilanthes*, including the purple-flowered *S. flaccidifolius*, from which an indigo dye is obtained, *S. stramineus*, *S. areniculus*, *S. oresbius*, and *S. Wardii*—the last four new species.

Along the forest paths, and clothing open banks, are species of *Sonerila*, *Torenia*, *Chirita*, *Begonia*, and various smaller flowers, such as *Polygonum capitatum*; while every rocky stream is invaded by mobs of gaudy coloured *Impatiens*. In more open situations, where high grass grows, the queer glutinous *Aeginetia indica* is seen, with tall slender bamboo orchids, and clusters of blue-flowered *Rhynchoglossum*; and in more shady situations again, many striking *Acanthaceae*. In the lower valleys there is also much secondary growth, where formerly there was cultivation. Here are impenetrable thickets of bramble, rank weeds, and high grass, with small trees, species of *Rubus* and a dense tangle of climbing plants, from

gross and overwhelming *Pueraria Wallichii* to slim twiners like *Codonopsis*, *Leptocodon*, and *Crawfurdia*.

The jungle, however, though of academic, and sometimes of economic, interest, is barren from the horticultural point of view. Far more interesting is

(ii) The Temperate Rain Forest. Here we find the first species of *Rhododendron*, which at still higher altitudes monopolize the ground. Scattered through the rain forest are the tree species of the 'Stamineum,' 'Irroratum,' and 'Barbatum' series; such, for example, as *R. Mackenzianum*, and the crimson-flowered species *facetum*, *ombrochares*, and *agapetum*. Most of the Burmese 'Maddeni' species also belong to the temperate forest—the epiphytic *R. dendricola*, the huge *R. sinonutalli*, *R. crassum* and *R. ciliicalyx*. The finest tree species of all, however, is *R. sinogrande*, whose near presence may be detected by the deep note of the rain drumming on its huge leaves, which are used by the natives for roofing their jungle shelters.

Amongst many other trees may be mentioned *Bucklandia populnea*, species of *Michelia*, *Magnolia*, *Schima*, *Castanea*, *Acer*, and many species of oak, such as *Quercus reflexa*, *Q. obovata*, *Q. lamellosa*, and *Q. Curtissii*. Also the chestnut-like *Castanopsis armata*, a fine tree, and the beautiful snow-white flowered *Viburnum Wardii*.

On very open slopes, on the borderland between jungle and temperate forest, a park-like formation is prominent. The trees are chiefly alder (*Alnus nepalensis*), pine (*Pinus Armandi*), and oak, more or less scattered, growing in an ocean of high bracken and rank herbage, amongst which may be found *Anemone vitifolia*, *Osmunda regalis*, species of *Drosera*, *Thalictrum*, etc.

The shrubs of the Middle Forest include, besides the *Rhododendrons* already mentioned, *Enkianthus*, *Euonymus*, *Rubus*, *Helwingia*, etc., and numerous woody climbers such as *Hydrangea*, *Schizandra*, *Clematis Spooneri*, *Vitis*, *Aristolochia*, *Akebia*, *Smilax*, and *Lonicera*. Epiphytes are more abundant in the temperate rain forest, where perpetual moisture is assured, than at lower altitudes, where the conditions incline more towards a longer dry season. At 7,000-8,000 feet, festoons, sometimes 30 feet long, of the lovely *Rhododendron Edgeworthii* drape the big trees, and here too may be found the brooms and queer Gesneriad-like fruits of one of the 'Vacciniodes' *Rhododendrons* (K.W. 5473). Lower down orchids abound. Every tree is smothered with them, including species of *Vanda*, *Saccolabium* (mats of *S. gemmatum* in alder trees, where the forest is open and park-like), *Dendrobium* (found even on pine trees, with whose arid trunks the gay flowers contrast curiously), *Bulbophyllum*, *Coelogyne longipes*, *Tainia minor*, *Cirrhopteridium Farreri* with brick-red flowers, *Habenaria corticicola*, and the striking new species *H. ophiocephala*, with its sack-like spur nearly three inches long, containing honey. We know little about the orchids of the Upper Irrawaddy region as yet, and there are doubtless hundreds of species to be discovered there.

Besides epiphytic orchids, there are many ferns, species of *Arisaema*, *Aeschynanthus*, *Agapetes*, and *Lysionotus* (including two new species, *L. Wardii* and *L. gracilis*), growing on the trees. The undergrowth consists largely of bamboo, but in addition occur remarkable species of *Arisaema*, such as the chocolate-and-white striped *A. Wallichianum*, with the tip of the spathe drawn out into a whip-lash from two to three feet long; several Liliaceae and Zingiberaceae (*Curcuma*, *Hedychium*), *Circaea alpina*, *Chirita umbricola*, species of *Begonia*, *Torenia*, and even *Primula*, such as the crimson woodland *P. seclusa*, little mauve-flowered *P. densa* (K.W. 3656), buried amongst the moss, and several of the 'Obconica' type. Another pretty rock plant is *Sedum filipes*, with thin, almost membranous, leaves and white flowers with brick-red stamens. On rocks also are Saxifrages of the *diptera* type, with fleshy leaves. Ground orchids also abound in the Middle Forest, where occur such species as *Calanthe Wardii*, *C. yunnanensis*, and *C. arcuata*; *Listera flabellata*, *L. unguiculata* (both new), and *L. micrantha*, not previously recorded from Burma; *Habenaria dicras*, *Oreorchis discigera* (sp. nov.), *Zeuxine pumila*, etc., etc.

There is much bamboo, but except where this is especially developed nowhere is it very difficult to penetrate the Middle Forest through an undergrowth consisting chiefly of tall herbs, bulbous plants, and undershrubs. The trees are characterized by straight, upright trunks, not branching near the ground, but forming a heavy canopy overhead. Plank buttresses are only feebly developed. Lianas are uncommon, but the heavy drapery of moss and other epiphytes makes it very difficult to distinguish the trees, which are most easily recognized by their fallen fruits. Others—such as species of *Ficus* and *Garcinia*—may be recognized by their latex.

However, enough has been said to give a general idea of the Temperate Rain Forest.

(iii) More important from our point of view is the Conifer and Rhododendron Forest, extending from about 8,000 feet to the limit of trees round about 12,000 feet, or more, according to aspect.

Here Rhododendron and *Abies* predominate. Larch occurs in some places, and the "coffin plank" Juniper is found scattered at about 9,000 feet altitude. This last is one of the finest of forest trees, upwards of 120 feet high and of immense girth. Another giant tree occurring locally is a species of *Pseudotsuga*.

At the lower limit of Conifer Forest where it passes into Temperate Forest are found numerous species of Rhododendron, including the following: a form of *R. bullatum*, which promises to be hardy in this country (K.W. 3038); *R. habrotrichum*, a 30-foot tree with large trusses of handsome flowers, pale pink, with a deep plum-purple blotch at the base of the corolla (K.W. 3042); *R. gymnogynum*, remarkable for its smooth tawny-purple glass-like trunk, with never a ragged flake of bark hanging from it (K.W. 3155); *R. siderium*, another fair-sized tree, with the silvery foliage of *R. grande*, and sulphur flowers with a purple blotch at the base (K.W. 3061);

R. tapeinum, a sulphur-flowered dwarf often growing epiphytically, or on granite rocks, and blooming both spring and autumn.

On exposed slopes the Temperate Rain Forest passes into Rhododendron Forest, comprising all the above species and others, besides many shrubs such as the beautiful and fragrant *Clethra Delavayi*, *Cotoneaster horizontalis*, *Rosa sericea*, *Ribes*, *Hydrangea yunnanensis*, *Rubus uropetalus*, and species of *Buddleia*, *Ilex*, *Prunus*, *Viburnum*, *Philadelphus*, *Lonicera*, *Enkianthus*, *Pyrus*, *Abelia*, etc. On north slopes, however, and in narrow windy valleys, the Temperate Rain Forest passes abruptly into Conifer Forest, without any transitional shrub belt. This shrub belt, however, is only the Rhododendron Forest dwarfed, and lacking the scattered Conifers found a little higher up. The monotypic *Beesia cordata* occurs as undergrowth in the forest.

About 9,000–10,000 feet, too, are found patches of meadow, occupying broad open ridges, and dips in which during the rains water collects. This meadow wages ceaseless warfare with the powerful hosts of bamboo which surround and encroach upon it. Characteristic plants are *Lilium giganteum* and several other lilies, *Nomocharis Farreri*, *Meconopsis Wallichii* (var. *fusco-purpurea*), *Androsace Henryi*, *Primula burmanica* (a new species of the 'Candela' section closely allied to *P. Beesian*), *P. helodoxa*, *P. limnoica*, several new species of Lousewort, as *Pedicularis laetangensis*, *P. atra*, *P. pseudoatra*, and others, both Chinese and Indian, such as *P. taliensis*, *P. Pantlingii*, *P. siphonantha* and *P. gracilis*; *Caltha palustris*, to mention something nearer home, *Dipsacus*, species of *Corydalis* with electric-blue flowers, *Polygonum*, *Allium*, *Epilobium*, *Thalictrum*, *Roscoea*, *Rheum*, *Aconitum*, and many large-leaved Compositae and Umbelliferae, besides scattered orchids, large Alliums, and the gorgeous purple-flowered *Omphalogramma (Primula) Coxii*.

These meadows, which, however, are never very extensive, vary in component parts. Sometimes big Umbelliferae or Compositae—especially large-leaved Senecios, predominate; elsewhere species of *Thalictrum* such as *T. semiscandens*, or of *Geranium*, or *Rodgersia sambucifolia*. On one steep slope, a small purple orchid, doubtless a *Habenaria*, grew in thousands. Sometimes an open glade occurs in the midst of the upper forest, and is filled with a sea of *Polygonum*, or *Strobilanthes* and other semi-shade-loving plants, growing man-high; while on the forested banks round the edge of the open will be seen the large-leaved crowns of *Primula sonchifolia*. This last in early spring, before the snow has melted, is a mist of azure blue—far bluer than the allied *P. Winteri* at least in its present wishy-washy form as cultivated in British gardens. But this may be said in favour of the latter—it is in cultivation; *P. sonchifolia* is not.

The meadow plants continue to grow in stature long after the flowers are over, until abruptly cut short by the winter. By this time many of them have attained a height of 6–10 feet. The climbing plants, which do not flower till late in the season—for instance,

species of *Crawfurdia*, climbing monkshood, etc.—of course grow much taller.

It is a curious fact that although light retards growth, in the forest most of the undergrowth is dwarf (e.g. the dwarf *Rubus potentilloides*, *Oxalis*, *Listera*, *Utricularia*, etc.), while the meadow plants are lanky.

The meadow, however, yields few plants of horticultural merit, and those mostly difficult of cultivation. *Nomocharis Farreri* is not likely to be a success, and will certainly never be a popular plant. *Androsace Henryi* (K.W. 3171) is in cultivation, but its umbel of white flowers is not particularly striking. *Primula helodoxa* is a fine thing, but *P. burmanica*, also in cultivation, is not yet well known, and is too like *P. Beesiana* to win a place for itself in British gardens. *P. densa* (K.W. 3536) and *P. seclusa*, a big coarse-leaved species, both from the forest, promise better. *P. limnoica*, too, though unpretentious, is pleasing, and some speak well of it. It was raised, I believe, from seed sent home by Farrer.

Of the rest *Meconopsis Wallichii* has been in cultivation for a long time—the sky-blue form, at any rate; and the purple form has nothing to recommend it. Most of the lilies, too, *L. giganteum* and *L. nepalense*, *L. Thomsonianum*, and others, are old friends. At 9,000–10,000 feet the Conifer Forest begins in earnest.

The undergrowth here is even more thin and scanty than in the Lower Rain Forest, so that it is quite easy to get through, except where, on the open ridges, dwarf, solid-stemmed bamboo forms impenetrable thickets. Where larger bamboo still prevails there is no other undergrowth. The all-devouring roots of the greedy giant grass monopolize the food, and the gloom completes the discomfiture of any intruding herb.

Elsewhere, however, where *Rhododendron arizelum* (K.W. 3101), a fine member of the 'Falconeri' series, with creamy flowers blotched purple at the base, ousts the bamboo, scattered plants of *Polygonatum*, *Clintonia*, *Cynoglossum*, *Anemone*, *Arisaema*, *Paris*, *Daphne*, *Euonymus*, and, on rocks, *Utricularia* (often on tree trunks also), *Tofieldia*, and the stately *Primula calliantha*, a coquette of the 'Nivalis' family which refuses the most amorous advances of our horticulturists. It flowers in May on damp moss-clad rocks in the dim light of the high forest; but a suspiciously similar plant occurs also on the alpine heights, lurking amongst the dwarf Rhododendron brooms. Another rock *Primula*, found in the gullies which stripe the steep forested flanks of the high ridges, is *P. praticola*, a white-flowered species with deeply dentate leaves, sometimes charmingly edged and veined with red. But though a member of an august family, it has nothing else to recommend it as a garden plant.

P. sonchifolia, another plant of the upper forest, as already recorded, grows on mossy banks under the shadow of Rhododendron and bamboo, while in the trickling streams hard by will be found colonies of *Mimulus nepalensis*, *Corydalis*, *Thalictrum*, and

Polygonum. A species of the 'Yunnanensis' section of *Primula* was collected in seed at the end of October, on a south-facing granite wall, shrivelled up in the glare of the winter sunshine. On limestone cliffs *P. fragilis* is found. But the drenched mountains of the N.E. Frontier of India are not particularly beloved by *Primula*, and the number of sections entirely unrepresented (so far as my experience goes)—such, for instance, as *Muscaroides*, *Suffruticosa*, *Maximowiczii*, *Soldanelloides*, *Amethystina*, etc.—is considerable. We shall meet with a few more species in the alpine region, however. Under the shelter of the bamboos will be found the graceful fan-shaped *Streptopus*, of the *Liliaceae*, its speckled bell flowers dangling under the arched leaves.

Towards the upper limit of forest Rhododendrons become dominant, and if it were not for the great quantity of bamboo, which rather queers their pitch, would be overwhelming. Sometimes we find forests of one species, as *R. arizelum*. On the steepest ridges the tree Rhododendrons never grow erect, but may be described as ascending. The main trunk often grows out horizontally—thus making an acute angle with the slope—for some distance, and only gradually assumes an upright position, if at all. This is no doubt a mechanical effect, due to its shallow root system. *Abies*, however, though mutilated and stunted, always grows erect, no matter how steep the slope. The latter, too, has the lower part of its trunk furred with moss and filmy fern and other epiphytic plants; while the tawny trunks of the Rhododendrons hold nothing except a little moss at the extreme base. Sometimes one of the big 'Haematodes' Rhododendrons takes command, especially in the high valleys. Bushy species of the 'Thomsonii,' 'Campylocarpum,' and 'Triflorum' series abound, and are often found lining the streams in the high valleys, but always inextricably mixed up with dwarf bamboo, which clings to them like some old man of the sea. Here, too, occur some of the more bilious-looking 'Trichocladums,' such as *R. brachystylum* (K.W. 3097), pallid yellow flowers with greenish spots. *R. aiolosalpinx* (K.W. 3096, probably) has rose-pink flowers, and is a member of the 'Thomsonii' series; it forms considerable thickets on the open ridge, thickets six or eight feet high—at least K.W. 3096 does; and K.W. 3300 has been definitely identified with Farrer's 'Aiolosalpinx,' which he describes as having white, pink, and cream flowers on the same bush. Then there is a purple-flowered 'Triflorum' with watery green leaves (K.W. 3299). It grows 8 feet high, and may answer to the name of *R. zaleicum*. A quite dowdy species is *R. Martinianum*; I saw a plant of it in flower at the beginning of November—a spotted purple horror. Much more promising was a sturdy 10-foot bush with the cut of a 'Fortunei,' growing on the fringes of the alpine region. I collected seed only (K.W. 5457).

More typical of the high forest, perhaps, are the semi-prostrate and ascending tanglements of the 'Neriiflorum' series—or, more specifically, 'Haematodes' and 'Sanguineum' type. These are first



FIG. 31. EAST RIDGE AND SUMMIT OF IMAW BUM (13,307 FEET).

[To face p. 154.]

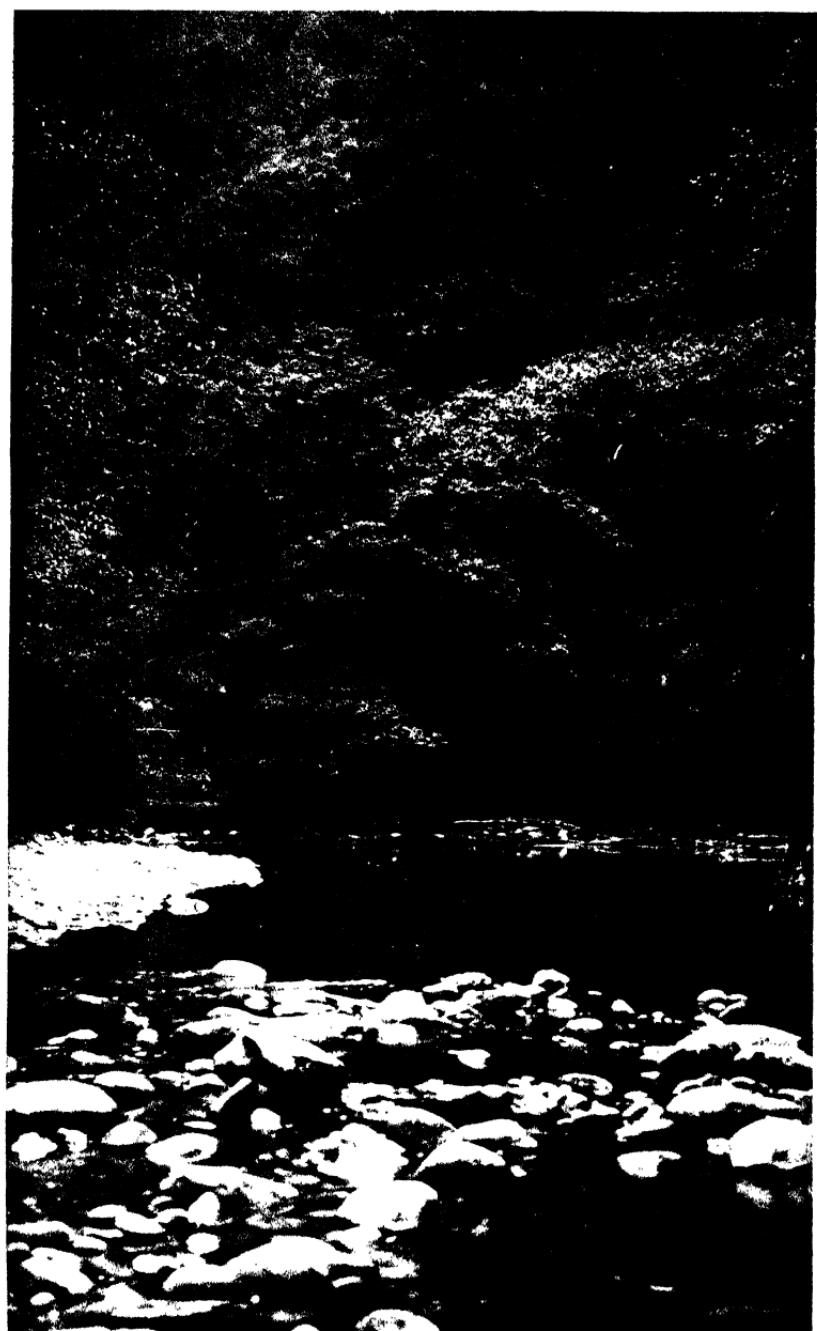


FIG. 32.- SPRING IN THE TEMPERATE RAIN FOREST OF N.E. FRONTIER OF BURMA.



FIG. 33.—CANE BRIDGE AT JUNCTION OF TAZU WANG WITH TARON.



FIG. 34.—TARON GORGE WITH MONKEY BRIDGE.

met with in the upper forest, and pass without a break into the alpine region. The finest of these is, perhaps, *R. euchroum* (K.W. 3267), with fiery trumpet-flowers ranging from brick-red to flame colour. There appear to be two distinct varieties, if not species—an alpine form and a woodland form. Another good plant is *R. herpesticum* (K.W. 3392), with tawny yellow trumpets, and a third is *R. aperantum*, with trusses of fleshy crimson flowers springing from tight rosettes of stiff leaves (K.W. 3301).

Above the tree line—but still involved with the accursed bamboo—are the carpet-forming species, which cover the steep cliffs of the alpine region with a riot of colour. Here we find *R. charitostreptum* (K.W. 3302), *R. myrtilloides* (K.W. 3303), *R. calostrotum* (K.W. 3390), *R. keleticum* (K.W. 5430), and *R. repens*, with an occasional 'Lapponicum' (K.W. 3304, a purple-flowered species with yellow stamens) and 'Anthopogon' (K.W. 3365, a beautiful pink-flowered dwarf). *R. myrtilloides* has pouting little plum-purple flowers, with a rich bloom and dark green leaves brilliantly silvered below. It is highly adaptable, occurring not only on the granite cliffs at 12,000–13,000 feet, but on the slate rocks in the river bed, 5,000 feet lower down. *R. calostrotum* and *R. keleticum* belong to the 'Saluenense' series, with monstrous flattened pentagonal corollas; they form little heathery bushes amongst the bamboo.

Here and there in sheltered nooks occur clumps of larger species, such as *R. cyclium* (K.W. 3408) and various 'Trichocladums.' But the gem of the dwarfs, to my mind, is a 'Campylogynum' with flesh-pink flowers and golden anthers (K.W. 3391). Unfortunately it is rare, while *R. myrtilloides*, which in fruit is scarcely distinguishable, is common. Nevertheless I believe there is some of the right plant in K.W. 3391.

But Rhododendrons, though the most conspicuous feature of the alpine region, are not the only one. Mixed up with them are many dwarf shrubs—*Potentilla fruticosa*, *Spiraea Wardii*, rose, willow, cherry, barberry, Cassiope, and others. On the rocks are cushion plants—*Diapensia himalaica* with pink or white flowers, *Androsace chamaejasme* and another, starred with flowers like golden sparks, etc. In pockets, violet-flowered *Dracocephalum* and the chalk-white blooms of *Arenaria pogonantha* shine wetly through the rain. Here and there are pools of peaty water and bogs, gay with the cheeky little mauve *Primula Dickieana*, and with clumps of violet Iris whose falls are veined with golden threads (K.W. 3386). On the scree are gaudy louseworts such as *Pedicularis multicaulis*, *P. nobilis*, *P. cernua*, and *P. burmanica*—all four new species, and tufts of *Polygonum Griffithii*; and the open grassy sward is spangled with the lemon-orange striped *Primula serratifolia* and numerous species of the graceful but obstinate *Cremanthodium*—*C. Wardii* (disc colourless, ray claret), *C. gracillimum* (disc purple, ray white), and others.

On gravel patches and rocks are mats of violet-flowered 'Bella' Primulas, such as *P. coryphaea* and *P. sciophila*, each flower with its

throat stuffed up with a pompon of white hair ; and other alpine flowers include masses of large smooth-leaved Saxifrage of the *purpurascens* type, many small golden-flowered Saxifrages, Gentians, Cyananthus, Corydalis, Lloydia, etc.

Many of these alpines, especially the shrubs, should be hardy in England, and little as we yet know of the Irrawaddy flora it has already yielded some promising plants to horticulture. It is astonishing how meagre is our knowledge of these mountains. Vast areas remain totally unexplored, and hold out promise of good things to come. We may say, then, that the vegetation of the Upper Irrawaddy basin, as a whole, more closely resembles that of Lower Burma than it does that of Upper Burma, as ordinarily understood. In other words, the dry zone of Central Burma (Mandalay) forms the only break in the Indo-Malayan Forest, which stretches from near the source of the Irrawaddy to below the equator, in a continuous belt, over 30° of latitude ; and even this break at the "dry zone" is more apparent than real, since such woody vegetation as occurs in the "dry zone" consists chiefly of stunted specimens found also in the wet forests.

Further, this Indo-Malayan flora extends eastwards into Yunnan, about as far as the Mekong gorge. Northwards it crawls up the valleys until it meets the descending streams of Himalayan and Chinese floras coming south along the high ranges. On the lofty ranges which enclose the eastern branch of the Irrawaddy the Himalayan element is at least as strong as the Chinese, showing that this flora has spread across eastwards, right round the headwaters of the western Irrawaddy.

THE BEAUTY AND USE OF THE VINTAGE PEAR.

By HERBERT E. DURHAM, Sc.D., etc.

[Read November 27, 1923; Mr. C. T. MUSGRAVE in the Chair.]

THE Pear-tree plays many rôles : it affords fruit for the table and a beverage to precede or accompany dessert ; as it stands, it is frequently a thing of beauty ; its timber is valued for carving and other purposes. The importance of its capability of producing a wine or alcoholic beverage may be connected with the very old sayings :

“ La poire crûe est un poison, . . .
 . . . Elle charge trop l'estomac,
 Étant cuite, elle y porte la guérison . . .
 Quand on a mangé de la poire
 Que le premier soin soit de boire.” *

Also “Après la poire, le vin ou le prêtre.” † For in producing the “wine of pears,” or perry, it may serve to afford a cure for its other ill-favoured qualities !

Perry has a history ; it has long been known. Palladius, who lived on the fringes of the third and fourth centuries, is quoted to show that the Romans preferred the wine of pears to that of apples, and he even gave instructions as to how perry should be made ; it was then called “Castimoniale,” a name which suggests appreciation.‡ Cato § lists a variety under the name of “Musteum.” Perhaps we may infer that this juicy one was used in the vat. At a later date, in the sixth century, St. Radegonde (A.D. 513), spouse of King Clotaire, is said to have drunk naught but mead and perry (piratium) after her retirement to the convent which she built.|| In the eighth century, St. Ségolène (Abbess of Troclar) refused all beverages except water and perry during Lent ; whether as a hardship or not is obscure, but it may be pointed out that perry goes well with fish, a quality that is not shared by its congener from the apple.¶ Charlemagne ** included cider-makers in his list of employments, and advised the employment on an estate of persons who could make wine, beer, cider, perry and any other beverages.

A letter is extant from the Abbot of Ferrières (mid-ninth century) inviting certain monks to come and taste his perry, of which he was evidently proud.

Hitherto I have not come across records dealing with perry at such

* Leroy, *Dictionnaire de Pomol.*, t. i., p. 65.

† Cotgrave, *Dictionary*.

‡ *De Re Rustica*, Lib. iii. cit.

§ *De Re Rustica*, cap. vii.

|| Fortunatus, Bp. of Poitiers, sixth century, *Vie de la Reine Radegonde*.

¶ Bollandistes, *Acta Sanctorum*, July 24, p. 633 cit. *La Cidrerie moderne*, Jacquemin and Alliot, Nancy, 1902, p. 2.

** *Capitulaires de Villis*, cap. xiv.

early dates in this country. Passing over many years, we come to the doctor Julien de Paulmier,* who extolled the virtues of cider and perry from the point of view of a medical man; p. 79, "On le (poiré) doit préférer au vin, et aux cidres grossiers en toutes douleurs arthritiques, ou gouttes, & toutes catarres et fluxions, qui sont excitées & entretenues par l'euaporation du sang, et des autres humeurs chaudes": a reputation which was handed on and reaffirmed by later appreciative authors.

About this time Olivier de Serres † mentions a perry pear which is still held in esteem: "Il y a du poiré, qu'on nomme Carisi, lequel se fait d'une seule espèce de poire, ainsi appelée, rendant meilleure boisson qu'aucune autre." Again, passing over many years, Evelyn in his "Pomona" (1664) gives us a few names of vintage pears which were then in favour: Bareland, Bosbury, and the Red and the White Horse Pears. It is by no means clear that the first two names are synonymous, though this has frequently been taken to be the case, for here and there, as with the next named author, we find the names sometimes linked with *and* and sometimes with *or*. Speaking of the Bosbury and some others, he says that they are "so tart and harsh that there is nothing more safe from plunder, when even a swine will not take them in his mouth," a daintiness which is not always shared by his twentieth-century representative, as I am informed. He gives us also an insight into the multiplication of sorts at that period (p. 28): "M. Lill of Marole [evidently misprint for Marcle], aged about 90 years, ever observes this rule: to graff no wild pear tree till he saw the fruit; if it proved large, juicy and brisk, it failed not of good liquor. But I see cause to say that to graff a young tree with a riper graft and of known excellency is a sure gain and hastens the return." The Thorn Pear is also mentioned ("Kal.", p. 76, Oct.), apparently for use on the table, evidently similar in season to our pear of that name, which is nowadays relegated to the vat. Worlidge ‡ gives a few additional names, but no descriptive effort that might make present sorts identifiable: "Pears that are esteemed for their vinous juices in Worcestershire and those adjacent parts are the Red and Green Squash Pears, the John Pear, the Green Harpury [perhaps the Chaseley or Hartpury Green ?], the Drake Pear, the Mary Pear, the Lullam Pear: but above all the rest are esteemed the Bosbury and the Bareland Pears and the White and Red Horse Pears. As for the Turgorian Pear, that yields the most superlative perry the world produces, mentioned in the Pomona of the most ingenious Mr. Evelyn, I only wish it were more dispersed." Langford § adds the Longland, Wild and Choak Pears to the list; he also contrasts the Bareland and the Bosbury.

About this time there was much difference of opinion as to which

* *De Vino et Pomaceo*, 1588, French trans. 1589, by J. des Cahaignes; reprinted, Rouen, 1896.

† *Théâtre d'Agriculture, etc.*, 1608, quoted by Decaisne, *op. cit. infra*.

‡ *Vinetum Britannicum*, 1676, p. 170.

§ *Instruction, etc., on Fruit Trees*, London, 1696, p. 147.

kinds yielded the best perry; advocates of the red-coloured pears seem to have rather held the field, but the colour of the perry was also considered as an index of quality. Thus Dr. Beale * remarks that "Pears make a weak drink fit for our *hindes*, and is generally refused by our gentry as breeding wind in the stomach; yet this drink (till the heat of summer hath caught it) is most pleasing to the female palate, having a relish of weak wine mixed with sugar." . . . The White Horse Pear yields a juice somewhat near the quality of Cyder; and the neighbourhood of *Bosbury* is famous for a peculiar Perry, which hath many of the Masculine Qualities of Cyder. It is as quick, strong, and heady, high coloured. . . . This Bosbury Pear is there called the Bareland." He also highly commends the blending of apple with pear. Evelyn records the pride of a certain Mr. Gritten in a beverage made from the May Pear and the Stocking Apple. Even at the present day there are many who know that the two fruits may be blended with superlative results.

About a hundred years later another great revival of interest in cider and perry commenced. Marshall † states that the Squash Pear was in highest esteem, Taynton being famous for its Squash Pear perry. The Oldfield has the attribute of being a favourite old pear which yielded an elegant flavour; the Barland had great repute in kidney diseases; whilst the Red Pear yielded a singular strength of perry. He also gives the earliest known mention of Huffcap as applied to perry—evidently from the strength of the liquor being comparable to the very strong ale which was known as Huffcap Ale, or simply Huffcap; a beverage which also rejoiced in such names as Mad Dog, Angel's Food, and Dragon's Milke. The Sack Pear is also mentioned, though there must have been many others in use.

The leading spirit of this period was undoubtedly T. Andrew Knight, a former President of this Society, with his "*Pomona Herefordiensis*" (1811). He gave coloured illustrations of the Oldfield, Taynton Squash (wrongly spelt Teynton), Longland (evidently the Red Longland), Holmer (wrongly spelt Holmore), Barland, and one of the many varieties then known as Huffcaps; the last is regrettable, as no doubt he would have been then able to infuse some order amongst the confusion of Huffcaps. He seems to have relied chiefly upon the drawings of the fruit, and gave little, if any, description of the varieties; here and there historical notes are given.

Soon after came Salisbury § who did little more than quote from Knight. However, he adds one to the family of Huffcaps, with one known at Rochford near Tenbury as the Rochford Longtail—this is suggestive of a pear which I received with the label "L. Uffcap" (perhaps to be translated as Longtail Huffcap). An ingenious farmer

* *Herefordshire Orchards*, 1656.

† This is curious, as, generally speaking, pears yield a stronger liquor than apples.

‡ *The Rural Economy of Gloucestershire, etc., and the Management of Orchards and Fruit Liquor in Herefordshire*, 2nd edn., London, 1796, vol. ii., p. 222.

§ *Hints addressed to the Proprietors of Orchards, etc.*, London, 1816.

from whom it seemed to have come suggested that it was of French origin, viz. Le Huffcap—the true Huffcap *par excellence*.

Salisbury remarks upon the “curious phenomenon in chemical attraction, that the juice of a pear, which when expressed with the action of the teeth alone may be found so extremely crude and austere as to render it difficult to swallow (and hence the name given of *choke pears* to many of this kind of fruit), should, as soon as the pulp is crushed, be found to change colour, and by uniting with the oxygen of the atmosphere, to almost instantly change, and become sweet.” The phenomenon is well described, but the change is due to interaction of the albuminoids of the cells with the tannins, whereby they both are precipitated. His derivation of the common appellation Choke, or Choaky, seems reasonable, but an educated old Herefordian told me that the Choke meant *hard* and *woody*, with no connexion either to astringency or to grittiness, characters which many perry pears possess in high degree.

After another gap we come to the great effort of the Woolhope Naturalists’ Club, under whose ægis Dr. Hogg and Dr. Bull contributed the greatest attempt hitherto seen in English pomology, “The Herefordshire Pomona” (Hereford, 1876–85), and also “The Apple and Pear as Vintage Fruits” (1886); had Dr. Bull been spared to continue his work, no doubt he would have made the last-named book more valuable, for in it he does give some few notes on tree characters, an important aspect of the study which his collaborator left untouched; this is curious, as contemporary Continental writers (Leroy, Decaisne, Mas, and many others) had long before recognized their importance.

Nineteenth-century writers in France have paid a superficial attention to perry pears in that country by contributing lists of names, often classified regionally but without description; thus Decaisne * occupies no less than twenty-three pages with perry pear names, and Leroy † names 137 varieties. Dubreuil ‡ lists 128 kinds, with regional distribution. Baltet § names some score of kinds and gives practical notes on juice and tree characters. It is to Truelle || that we have to turn for a methodized attempt to record descriptions, mainly limited to fruit characters, but in the last-named work are some details of history and tree characters. In the light of the known importations of vintage apple-trees from France, it is highly probable that vintage pears were also introduced; further study may reveal identities amongst the present fruits of the two countries.

Enough has been said to show that the perry pear, though appreciated, has been left to word of mouth rather than to written history. (N.B.—The same may be said for hosts of vintage apples

* *Le Jardin Fruitiére, etc.*, 1858.

† *Dictionnaire de Pomol.*, 1867, t. I.

‡ *Cours Élémentaire, etc.*, 1846.

§ *Traité de la Culture Fruitière*, Paris, 1889, p. 321.

|| *L'Art de Reconnaître, etc.*, Paris, 1893, and *Guide pratique des meilleurs Fruits, etc.*, 1895.

in this land.) In the present day, perry is comparatively little known, and undeservedly so ; there are even many who have never heard of it, though on the other hand there are those who possess the discriminating palate of a St. Radegonde or a St. Ségolène and prefer it to other beverages. Perry possesses both delicacy and distinction ; it may be made so that the connoisseur of fine flavours and exquisite bouquets is able to rank it with the finest of wines. Unlike the apple, different varieties produce far more differentiation of flavours, in which respect the wine of pears approaches towards that of the grape, whose multitudinous varieties are so well known. In alcoholic strength a considerable range is afforded by different pears, from the 8 to 10 per cent. of the "Huffcap" type down to some 3 or 4 per cent. of less sugary varieties ; but, like Champagne-wine in the Champagne district, it bears dilution with ordinary water if a less alcoholic beverage be desired. Lastly, it may be noted that it is a necessary ingredient in a satisfactory "Cider Cup." Like other wines, perry will afford vinegar when suitably treated ; the writer used to hold that it was not possible to make a real salad without cider vinegar, but now he holds that perry vinegar is the really indispensable constituent.

The perry pear likewise has a certain importance from its inherent power of supplying distilled alcohol. For instance, in future times of stress of war, the possession of adequate alcohol for industrial or motive purposes may be a very great advantage. In a recent visit to France and inquiry into the question, one could hardly fail to be astounded at the immense organization that now exists in that country for the production of distilled alcohol, ostensibly for industrial purposes. The possession of abundant perry pear orchards may perhaps be an asset of national defence in the future.

Now let me turn to the beauty and decorative character of the trees. The variety and grand proportions of the older trees during the leafless winter stage may evoke admiration ; in springtime, when covered with snowy blossom, they become a delight to the eye ; later in the year those laden with red fruit add to the view, and as the leaves change to autumn tints no more gorgeous sight can be seen than a perry pear orchard glinting with crimson, gold and green in the autumnal sunlight. Let me quote the appreciative words of M. Vimont, an evident admirer of these grand old trees* :

"Enfant du Bocage [a noted perry district in Normandy] je vénère les vieux poiriers, témoins des plaisirs et des peines de nos ancêtres. Je me plaît dans leur contemplation et c'est avec une joie toujours nouvelle que j'étudie et admire leurs superbes proportions. Le vieux poirier est le bienfaiteur de l'homme, et jamais je ne passe devant lui sans m'arrêter, ne fût-ce que durant quelques courts instants."

In an appendix is given the list of varieties hitherto met with and named, with a few notes and analytical data. In regard to the latter, these have been selected from the season 1922, a very bad

* *Le Cidre*, Paris, Année V., 1892, p. 312.

ripening year, though the crop was prodigious, so that the value of the figures may be more or less comparative as between different varieties. The sugar is given in parts per thousand, the acidities in the International Convention as the number of cubic centimetres of normal (N/1) alkali needed to engender neutrality in a litre of juice, the tannin in milligrams per litre at a 0·558 permanganate ratio.

I may note here that, seeing the age of many of the old sorts and the likelihood of many being lost for all time if something is not done, Messrs. Bulmer have commenced to regraft some to make a specimen orchard whence further propagation may be made in the future.

Now it is my pleasant duty to express my thanks to so many who have aided me in my work. Numberless farmers have given me of their knowledge and free access to their orchards ; it is almost invidious to mention any names amongst so many kind helpers, but I must say a word of thanks to my old friend R. H. Cazalet and also to Mr. Esmond Bulmer, who has been most helpful both in the orchard and the laboratory—in fact a major share of the analyses given is due to his work.

Finally, I have the pleasant duty to discharge of asking the Society to accept an album of photographs, which I have taken, from Messrs. H. P. Bulmer & Co. of Hereford. It is put together on the loose leaf principle, so that further additions may be made as occasion may offer ; the scheme adopted was to portray tree, fruit and leaves of each variety—at present there are many gaps to fill. The fruit is approximately natural size as shown by the included scale ; the leaves half size, some pressed and dried, and others in the natural state.

APPENDIX.

The following is a list of perry pears hitherto heard of, met with, or identified. It is hoped to publish an account from the technical or pomological side. Names included in inverted commas are fancy names temporarily given until the real names can be traced. The * signifies that the variety is represented in the album given to the Society and in a similar one in the possession of the Woolhope Naturalists' Club at Hereford ; the letter "K" signifies that the variety is figured by T. A. Knight (*op. cit., supra*), and "H. & B." figured or named by Hogg and Bull. Localities or remarks not yet personally verified are included in brackets. Analyses are all of year 1922. Varieties actually examined are in italics.

Alphel or *Alfel*. (Witley Court, Worcs.)

**Arlingham Squash*. H. & B. Taynton region ; trees at Bartestree noted by H. & B. apparently have ceased to exist. Ripe about mid-October.

Ashdown. (Early pear ; also used for eating.)

**Aylton Red*. H. & B. Distributed widely, e.g. Nuttall farm, Much Marcle Glasshouse, Taynton. Total sugar, 89 ; acidity, 40 ; tannin, 400. 16/X.

**Barland*. K. ; H. & B. Many orchards, e.g. The Field, Hampton Bishop ; very fine trees at The Hill, Much Marcle. Total sugar, 79 ; acidity, 88 ; tannin, 1800. 10/X.

Barnet. Specimen from Long Ashton, origin uncertain.

**Bartestree Squash.* One large old tree at Bartestree Court Farm; proper name unknown; slight resemblance of fruit to Arlingham Squash, but leafage quite different. Total sugar, 119; acidity, 50; tannin, 120. 4/X.

Black Horse. H. & B. Name not yet met with.

Black Huffcap. Arncroft, Breinton. H. & B. Ripe early December.

**Blakeney Red.* H. & B. Commonly distributed, e.g. Court Farm, Hampton Bishop; Poytresses Farm, Newent. Given a bad name by H. & B., which is contested by many makers. Total sugar, 86; acidity, 55; tannin, 920. 11/X.

Bosbury Scarlet. H. & B. Perhaps identifiable as Aylton Red.

**Brinsop Red Longtail.* Fine old tree at Court Farm, Brinsop. Total sugar, 108; acidity, 48; tannin, 400. 11/XII.

**Brinsop Y. H.* A tree at Glebe House, Brinsop. Total sugar, 85; acidity, 30; tannin, 200. 8/XII.

**Brockhill.* Two fine old trees at The Field, Hampton Bishop. A small, round, rather oblate, green pear. Total sugar, 86; acidity, 78; tannin, 380. 21/X.

Brown Huffcap. See Rock.

Brown Russet. Two rounded-top trees at Rye Court, Berrow. Fruit fairly large, rounded and irregular, thickly coated with dull brown russet. Total sugar, 119; acidity, 100; tannin, 40. 30/X.

**Butt.* H. & B. Common, e.g. Alderley End. Extremely astringent when bitten. Total sugar, 119; acidity, 70; tannin, 1240. 6/XI.

**Carmine Core.* Locality unplaced; once met with; evidently related to Sanguinole; externally resembles the Red Horse. (See T. A. Knight, "A Treatise on the Culture of the Apple," etc., 4th ed., 1813, p. 145.)

Chaseley Green. H. & B. Trees at Newtown Farm, Newent. Does not seem to be commonly known. Ripe about mid-November.

Cheatboy. H. & B. Not yet traced; in Castlemorton neighbourhood the name 'Ticeboy' seems to be used.

Coppice. See Copy.

**Copy.* H. & B. A fine tree at Bannut Tree House, Castlemorton; also trees at Hownall, Taynton. The fruit has a long period of ripening from early October to November. Total sugar, 119; acidity, 60; tannin, 180. 16/XI.

Cumber. (Huntley, Glos.)

Dando. From Long Ashton; origin uncertain.

Dymock Red. See Thurston's Red.

Eye. Tree at Tawney's Farm. (Round, yellow with streaky red, very pretty little pear, good to eat, ripe Michaelmas. Has a large eye.)

**Flakey Bark.* Dinedor Cross; Hownall, Taynton. As yet unnamed variety with the character of bark expressed in the fancy name. Total sugar, 110; acidity, 44; tannin, 1800. 16/XI.

Forest. H. & B. Not yet traced.

Fudger. (Little Hereford.)

Gennet. There are, however, several Gennets, red and green; these appear to be small early pears which are also sold on the market for eating.

**Gin.* Fine tree at Highfield, Newent, in which region there are scattered trees, which bore a crop of 30 cwt. in 1922. Perhaps owes its name to flavour of fruit, which distinctly suggests the juniper flavour of gin. Fruit somewhat resembles Butt in shape, but turns more yellow on maturing; it is without the intense astringency of the Butt. The short spurring on leading boughs is suggestive that there may be a parental connexion between the two. Some specimens of Newbridge also resemble it. Total sugar, 89; acidity, 68; tannin, 360. 3/XI.

'*Green Horse.*' See 'Rye Court Green Horse.'

Green Huffcap. See Huffcap, Green.

Green Norman. Perhaps synonym for Rock.

Gregg. H. & B. Not hitherto found, unless full name is that next given.

**Gregg's Pit.* Nuttall Farm, Much Marcle. (Fruit resembles that of Taynton Squash, but is without the red colouration.)

Hampton Rough. Trees at Tawney's Farm, Dymock. (Small green pear like an Oldfield.) Three trees were regrafted by the present owner's father, so they probably were not thought so much of as the replacing Turner's Barn.

Hartpury Green. H. & B. Given as synonym for Chaseley Green. Perhaps the Green Harpury of Worlidge.

**Hellens Green.* Old tree said to have been planted in 1710. From leaf characters it is not either Chaseley Green or Brockhill. (Fruit late maturity.)

Hill End Green. Taynton. Perhaps the same as 'Huffcap, Green, of Ford,' below. (Dark green with some russet, very juicy, somewhat shape of Brown Huffcap [= Rock] but larger; leaves deep green.)

- **Holmer*. Common. Very fine tree at Chandos Farm, Much Marcle. K.; H. & B. Total sugar, 121; acidity, 70; tannin, 800. 9/X.
- Honeydew*. Grove Farm, Taynton. A small, pyriform, somewhat russeted pear. Note that Honey, Honeydew, Honeyknapp are stated to be indefinite names.
- Huffcap A*. Poulston Court. Small round pear.
- **Huffcap B*. *Chandos*. Chandos Farm and Hellens, Much Marcle. (Long-shaped fruit.) By leafage seems possibly identical with Yellow Longland.
- Huffcap Black*. See Black Huffcap.
- **Huffcap Ford's Green*. Taynton House Home Farm, Taynton. Dark green pear with russeted ends; leaves dark green. Perhaps Hill End Green. Total sugar, 58; acidity, 62; tannin, 1040. 23/XI.
- Huffcap Knight's Green*. Barfrestree Court Farm. Fruit ripe about mid-October; closely resembles figure given by Knight in shape and colour. N.B., the original drawings are preserved in the Free Library, Hereford.
- Huffcap Yellow*. See Yellow Huffcap.
- Ingestone Green. (Much Marcle region.)
- Knapper*. Tawney's Farm, Dymock. (Earlier than Tump; good both to eat and for perry.)
- Knockdown. H. & B. Not yet traced.
- Late Treacle. See Thurston's Red.
- **Longland Red*. Common. K.; H. & B. Locally often called Longdon or Red Longdon. Total sugar, 100; acidity, 80; tannin, 960. 2/XI.
- Longland White*. H. & B. Not traced. Given by H. & B. as synonym for White Horse.
- **Longland Winnal's*. H. & B. Highfield, Newent; Tawney's Farm, Dymock. Total sugar, 96; acidity, 54; tannin, 1920. 16/XI.
- Longland Yellow*. Orchard near Station, Newent. Long-shaped, double-coned fruit, which by description is shape of Chandos Huffcap, whose leaves also are similar. Yokeing House from Newtown Farm has similar leaves. Total sugar, 111; acidity, 66. 12/X.
- Longsnout. See Sow.
- Longstalk. See Sack.
- Lumberskull. See Sow.
- Mill. H. & B. Not traced yet.
- **Moorcroft*. Common. Fine series of trees at Poytresses Farm, Newent. H. & B. Total sugar, 96; acidity, 57; tannin, 240. 5/X.
- Murrell*. Tawney's Farm, Dymock. Two trees. (Also at Murrell's Farm, whence probably the name.) (Ripe Michaelmas; round yellow pear; ripe after Thorn and Tump; rich-coloured perry.)
- Nailer*. Tree at Glasshouse, Newent. Given as synonym for Thurston's Red, which it much resembles in appearance; ripe mid-November; but specimens have not the intense astringency and perhaps are distinct.
- **Newbridge*. H. & B. Ripe during early October. Largish green fruit, rather variable both in size and shape; rather acid, moderate tannin.
- **New Meadow*. Fairly common, e.g. Hownhall Farm, Taynton. Not a stout grower; leafage thin and open. H. & B. Total sugar, 98; acidity, 40; tannin, 1050. 23/XI.
- Norton Butt*. Clifford's Manor Home Farm, Newent. H. & B. By some regarded as Butt and not as separate variety. Tree habit is similar, but the fruit is much larger than the type. Juice analysis same as type.
- Oak Verlan*. Communicated by R. H. Cazalet, Esq. Said to resemble White Horse.
- **Oldfield* (commonly called Olville). Common. Fine trees at Haynes Farm, Taynton. K.; H. & B. Several similar-looking pears pass under the name; a high acidity serves as one distinguishing mark. Total sugar, 113-121; acidity, 52-58; tannin, 320. 14/XI.
- Parsonage. H. & B. Not traced.
- Paxford. (Willarsey, Broadway, Worcs.)
- Pig. See Sow.
- **Pine*. H. & B. The Pint Pear is often called by this name; it is quite distinct. The curious flavour probably gives the name, though not much like that of the Pine Apple. Total sugar, 109; acidity, 46; tannin, 320. 19/X.
- **Pint* (often called Pine). Fairly common. Not a big grower; some good trees at Poytresses Farm, Newent. Very liable to caterpillar attack; leaves more finely undulating than any other sort I know; undersides and shoots very downy. Acidity, 140; owing to high acidity further analysis was not made.
- Pixley Red. Perhaps identical with Aylton Red. Ripe early October.

Poplar. Specimens from Mr. Cazalet. Smallish pear-shaped fruit entirely covered with bright golden russet; stalk very thick and fleshy. An apparently identical pear from Bartestree Court gave high sugar value. Total sugar, 139; acidity, 56; tannin, 80. 19/X.

Red Aylton. See Aylton Red.

Red or Red Horse. Common. Seemingly a number of red varieties occur, e.g. Carmine Core, Bosbury Scarlet, Pixley Red, and Aylton Red. Differential diagnosis is often difficult. Total sugar, 109; acidity, 74; tannin, 1280. 30/X.

Red Longland. See Longland Red. Note this is very commonly called Red Longdon; that this was originally a place name from Longdon, Glos, seems unlikely from the older authors who quoted it; see text.

*'Red Longtail.' See Brinsop Red Longtail.

Rochford Longtail. (Recorded by Salisbury.)

**Rock.* H. & B. A number of very fine trees at Poytresses Farm, Newent, in which neighbourhood it is called the True or the Brown Huffcap. H. & B. mention the original tree existing at Pendock, and that it was of upward growth. The tree I was shown as the original tree is of low, rounded habit, like all other Rocks seen. Close by there is a Windsor which has a very upright habit, and possibly this was the tree that attracted H. & B.'s memory. Total sugar (not quite mature), 132; acidity, 80; tannin, 11,000. 27/XI.

Rough Coat. (Poulston Court, King's Caple.)

*'Rye Court Green Horse.' Large green pear, rounded; ripe early October.

*'Rye Court Y. H.' See 'Y. H. Rye Court.'

**Sack.* H. & B. Sometimes called Longstalk (or, vernacularly, 'Longstuck'), also Yellow Huffcap. A small oblate pear with sepals laid back starwise. Fine trees at Highfield and Poytresses Farms, Newent. Total sugar, 106; acidity, 44; tannin, 160. 11/X.

Sheelbush or Sheelbank. (Poulston Court, King's Caple.)

Shortlands. Small, pear-shaped, early, blotted mid September.

Slipper (at Bushbank).

**Sow.* Two trees in cottage garden, Wellington Place, Tupsley. Longsnout, Pig, Lumberskull and Lomberbrain have been given me as synonyms. H. & B. list these as apparently distinct sorts. A late double-coned fruit, without grit and very hard till blotted (reputed to make a very strong perry, hence names of Lumberskull and Lomberbrain). Total sugar, 94; acidity, 32; tannin, 220. 27/XI. Fruit still sound a month later.

Spice. Bannut Tree House, Castle Morton. A very old tree, much lopped; middle sized, pear-shaped fruit; thorns develop on the spurs, and perhaps the name originally was Spikes.

**Stonyway.* Trees at Court of Noake and Brinsop. H. & B. Small, axial growth, some almost like a trained pyramid. Total sugar, 93; acidity, 28; tannin, 120. 18/XI.

**Taynton Squash.* K.; H. & B. Fine trees at Chandos Farm, Dymock; one old stager near the Church is almost the only one now existing in Taynton Parish; it is much broken, and will hardly endure many more years. At Hellens a row of young trees exists, grafted by the late Mr. Radcliffe Cooke.

**Thorn.* Common. Row at Monk's Walk, Hellens. H. & B. Total sugar, 88; acidity, 52; tannin, 240. 11/X.

**Thurston's Red.* Also called Billy Thurston, [Billy Williams, Late Treacle, and ? Nailer. H. & B. Total sugar, 71; acidity, 42; tannin, 4360. 27/XI.

Treacle. A large, rather irregular pear, deep green becoming brownish-yellow, russeted near stalk, variable in size. Much valued; a series of trees at Highfield, Newent. Total sugar, 116; acidity, 25; tannin, 960. 10/X.

**Tump.* Widely distributed, e.g. fine trees at Elliot's Farm, Taynton. H. & B. Small, often very irregular asymmetrical shape; varying from pale yellow to orange. Quite a favourite, of which H. & B. make the curious remark "that it is too early to be of much use," though some fortnight later than the celebrated Taynton Squash and coeval with many pears ready about the beginning of October. Also called Tun Pear (cp. Butt and Pint) whence, with the intermediate name Tumper, the word was probably derived. Total sugar, 106; acidity, 50; tannin, 880. 6/X.

Tumper & Tun. See Tump.

**Turner's Barn.* H. & B. Fairly widely spread around Marcle, Dymock and Newent, hence evidently prized. Very upright growth of a number of main boughs helps recognition. A small, round, rather flattish fruit, green or with an orange or ruddy flush; irregular more or less upstanding eye. Total sugar, 119; acidity, 56; tannin, 400. 21/X.

Vintage Favourite. H. & B. Not yet traced.

- **Water Lugg*. Old tree at Hellens recorded to have been planted soon after 1700. Has a curious down-growth in its channelled stem. (Green, round, late.) The leaves are of large size for a perry pear.
- **White Bache*. Also called White Beech, Bache's White. H. & B. Fine trees at Poytresses Farm, Newent; spreading habit; fruit smallish to medium, pale, turbinate; the attached end of stalk is swollen and knobby; leaves somewhat downy on underside, perhaps giving the name. Total sugar, 98; acidity, 50; tannin, 440.
- **White Horse*. Widely distributed, e.g. Bellamy's and Tawney's Farms, Dymock. H. & B. There are a number of largish rounded green pears which are difficult to distinguish; the true White Horse has sharply serrated leaves of a broadish oblong shape with or without an acuminate point. The high acidity is also a feature. Total sugar, 104; acidity, 100. 10/X and 30/X.
- White Squash. H. & B. Not yet traced.
- Winnal's Longland. See Longland, Winnal's.
- Yellow Huffcap. (a) Synonym for Sack; (b) Low, rounded-top tree, 'Newtown F., Yellow Huffcap.'
- Yellow Longland. See Longland, Yellow.
- **Yokeing House*. H. & B. After much search, tree found at Newtown Farm, Newent; leafage suggests association with Yellow Longland and Chandos Huffcap, but fruit has yet to be examined. The trees at Rye Court, Berrow, *vide* H. & B., apparently no longer exist.
- 'Y. H. Brinsop.' At Glebe House, Brinsop; not yet named. Total sugar, 85; acidity, 30; tannin, 200. 8/XII.
- 'Y. H. Rye Court.' Old tree at Rye Court, Berrow. Fruit resembles a very large Oldfield. Total sugar, 106; acidity, 62; tannin, 240. 20/X.

BOTANICAL ILLUSTRATION FROM THE INVENTION
OF PRINTING TO THE PRESENT DAY.

By Dr. B. DAYDON JACKSON, F.L.S.

THE object of the present paper is to describe the various methods of producing representations of plants, from the invention of printing by movable type, to the modern methods in monochrome and coloured plates, excluding single drawings by hand and photographic prints.

There are three main methods :

1. Where the design is in relief, the printer's ink being deposited on the raised surface, and taken off by pressure upon the paper : as in wood-engraving.
2. Where the design is cut or bitten into a metal plate, the ink rubbed into the incisions, cleaned off the intervening parts, and transferred by pressure to the paper : as in copperplate printing.
3. Where the design neither projects nor recedes from the level surface, but remains available for printing by physical or chemical means : as in lithography.

The early works of the old printers were illustrated by wood blocks from pen-drawings which had been copied again and again by the scribes. In the beginning the drawings were artistic work, but in the course of time, being copied by scribes, themselves devoid of artistic talent, they became so degraded that they failed to give a true idea of the plants they professed to represent. To use the expression of a recent commentator on these "incunabula," they might be taken as the first attempt of a child to trace the outline of the plant intended, so that the picture was an untrue representation of the original, and might serve as an indifferent emblem of various plants.

Reproductions of these may be found in Mrs. Arber's "Herbals" (Cambridge, 1912), taken from the works there specified, such as Konrad von Megenberg's "Das Püch der Natur," 1475; Apuleius Platonicus's "Herbarium," 1484; "Herbarius," a quarto by an unknown author printed at Mainz in the same year as the last, also styled "Herbarius Moguntinus"; and Arnaldus de Villa Nova, "Tractatus de virtutibus herbarium," 1499. These grotesque figures fully deserve the description of Dr. St. Lager; but in 1485 there appeared a volume of greater value and importance—the German Herbarius, "Herbarius zu Teutsch." The author was a rich man who had travelled in the East. The medical portion was contributed by another hand, probably Johann von Caub. It will be found in most bibliographical works signalized by the quotation of the first phrase of the preface : "Offt und vil habe ich by mir selbst betracht die wundersam werck des schepfers der natuer." [Many a time and

oft have I inwardly regarded the wondrous works of the Creator of the Universe.] This book represents a distinct advance upon previous attempts. The illustrations, being drawn with greater freedom and truth, mark an important step forward.

Later than these works was the famous "Hortus sanitatis" (Mainz, 1491, and many subsequent editions); it was largely derived from "Herbarius." The first word of the title is frequently spelled "Ortus"—the rise or beginning—seemingly a play upon the original title, "The Garden of Health," familiar from the German version "Gart der Gesundheit." The French editions were called "Le grand herbier" and "Le jardin de santé." The English translation employed in its several editions the wording "The Grete Herball." The engravings were retrograde compared with the "Herbarius zu Teutsch." Mrs. Arber, in her previously mentioned volume, has reproduced many of these uncouth and quaint figures.

The works with rough pictures were succeeded by a group of better ones; the first being Otto Brunfels, containing drawings from the living plant by Hans Weiditz which are especially noteworthy as depicting even the faded leaves of the specimens used as models in his "Herbarum vivae icones," Strasburg, 1530. Hieronymus Bock, who translated his surname into Tragus, was a contemporary of Brunfels. His book, published in German in 1539, was turned into Latin by David Kyber in 1556, and with its fine woodcuts became deservedly popular. But it was overshadowed by the splendid folio of Leonard Fuchs, issued at Basel in 1542, as "De historia stirpium," and the grand cuts have never been surpassed. This volume is distinguished by the portraits, at the end, of the two artists and the engraver, whilst at the beginning we find the author's portrait at full length.

From this time the output of herbals and botanic volumes became so great that they cannot be considered in detail. The most popular writer was Pier' Andrea Mattioli, whose commentaries on the "Materia Medica" of Dioscorides, in various translations, reached nearly seventy editions. The edition first printed at Prague in 1562, contained noble woodcuts with the engraver's device of a burin, or graver, at the foot of each block. Latin versions were produced by the Valgrisian Press at Venice in 1565 and again in 1569; at least three editions in Italian were issued from the same press in 1570, 1581, and 1604. The figures were nearly as large as those of Fuchs's splendid folio, and had more shading added.

Towards the end of the sixteenth century many botanic books came out at Antwerp from the establishment of Christopher Plantin, who became possessed of so many woodcuts as almost to hold a monopoly of illustrated herbals. Among them was the "Cruydeboeck" of Dodoens—latinized into Dodonaeus—which was issued in a Latin form as "Pemptades" in 1583 and 1616. Charles de L'Escluse, better known as Clusius, had issued octavo volumes detailing his discoveries in Spain and in Hungary, which were combined into a

folio entitled "Rariorum plantarum historia" in 1601, and were followed by his "Exoticorum libri decem" in 1605. Our own countryman, John Gerard, printed his "Herball" with blocks borrowed from the "Eicones" of Tabernaemontanus (whose German name was Bergzabern) together with fourteen specially cut for him, amongst them an excellent figure of the potato, which he grew in his Holborn garden. His portrait shows him holding a potato plant in his hand. In 1633 Thomas Johnson brought out a revised and much improved edition, in which he was greatly helped by his friend John Goodyer, of Petersfield, whose excellence as a botanist has recently been established in the volume by Mr. R. T. Gunther, the librarian of Magdalen College, Oxford, to which foundation Goodyer had bequeathed his books and papers.

Johnson's edition was so soon sold out that it had to be reprinted in 1636.

A contemporary of these two botanists was John Parkinson, who published a volume with the punning title "Paradisi in Sole Paradisus Terrestris" in 1629, reprinted in 1656, and in modern times. The title means "Parkinson's Earthly Paradise." The book treats largely of florists' flowers, and is illustrated by engravings on folio blocks. The old writers made use of blocks of pear-wood cut "plank-wise"—that is down the grain and not transversely. In 1640 the same author brought out his "Theatrum botanicum," with wood-blocks cut in England in a rough fashion.

Wood-engraving had by this time begun to deteriorate. The posthumous "Historia plantarum" of Johann Bauhin, which saw the light in 1650–51, in three folio volumes, thirty-seven years after the author's death, and the surviving fragments of the "Campus Elysii," which had taken so many years of the two Rudbecks' lives to compile are testimonies to this statement. A copy of the second volume is at the Linnean Society as part of the library formed by Linnæus. Unfortunately twelve volumes in folio were destroyed by the disastrous fire at Uppsala in 1702.

Towards the middle of the eighteenth century a great revival in wood-engraving took place when Thomas Bewick made use of the *flat black* and the *white line*, thus securing natural effects in place of the unsuccessful endeavour to copy the black line of the copper-plate engraver. Thornton's "New Family Herbal," London, 1810, is illustrated by Bewick's blocks, though these do not display the full charm of such volumes as Bewick's "Animals," 1790, and especially his "Birds," 1797, 1804, where the fur and feathers are delightfully depicted, and the surrounding trees and herbage most characteristically treated.

Great manual skill continued to be shown during the half century which followed. I may call attention to the admirable portraits of plants in Baillon's "Histoire des plantes," 1867–95, and his "Dictionnaire de Botanique," 1876–92, where aerial perspective is attained, and the branches more distant from the spectator are made

to recede by more delicate workmanship. The *Gardeners' Chronicle* and the *Garden* continued to employ woodblocks till about the last quarter of the nineteenth century, when processes depending upon photographic methods took their place. The last work I may mention as showing fine skill and artistic workmanship is the three quarto volumes of Robinson's "Flora and Silva," issued in 1903-5.

With this we leave the process of wood-engraving to take up the consideration of plates produced in metal.

Reverting to 1592 we find a small quarto entitled "Phytobasanos, or the Touchstone of Plants," issued by Fabio Colonna (or Columna) at Naples, with thirty-six plates etched on copper by the author himself, and noteworthy for depicting single flowers or florets, as well as the habit of the plants. The process consisted of covering the surface of a polished copper plate with a ground mainly composed of wax, and with a needle tracing the design through the ground to the metal. A wall of wax was then raised round the edges of the plate and dilute nitric acid was poured over the prepared plate, the design being attacked by the acid and the lines bitten below the surface of the metal, the bubbles arising from this biting being brushed away with a feather. The acid being poured off and the surface rinsed clean with plain water, the wax walls and ground were removed, and printer's ink rubbed into the lines by a roll of canvas, the surplus ink removed from the flat surface and a damped sheet of paper placed upon it; the print was taken by heavy pressure under a roller, the paper pressed into the ink lines taking up the design thus prepared. The same author brought out a larger work, his "Ekphrasis," with 131 similarly prepared plates, in 1606, and again in 1616, at Rome. Shortly afterwards a Frenchman, Paul de Reneaulme, issued his "Specimen historiae plantarum," with twenty-five plates, in 1611 at Paris, and Prospero Alpino in 1629 wrote, and his son, Alpino Alpino, at Venice, brought out "De plantis exoticis," with more than 100 etched plates, in 1627. Dillenius etched the plates to his "Hortus Elthamensis" in 1732, and "Historia Muscorum" in 1741.

Almost contemporaneous with these issues there came out several fine volumes with plates produced by copperplate engraving—that is, the design was cut into the plate with a graver by a professional engraver, the actual printing being done in the same manner as from an etched plate, the ink being confined to the incised lines or stipple and conveyed to the plate by pressure. Amongst these may be mentioned Besler's "Hortus Eystettensis," a large folio published in 1613; Crispin van de Pas's "Hortus floridus," in 1617; Rheede tot Drakenstein's "Hortus malabaricus," in twelve folio volumes, 1676-1707; Morison's "Historia," 1689-99, and Plukenet's works, 1691-1705. For other examples of copperplate engraving I may instance S. Vaillant's "Botanicon Parisiense," 1727, folio; Ehret's drawings in Linnæus's "Hortus Cliffortianus," 1739; Sole's "Mentha," where colour is attempted, 1798; Boott's "Carex," 4 vols., 1858-67, quarto;

Thuret's "Algae," most delicate plates, 1878; sumptuous coloured plates from drawings by P. J. Redouté in the "Liliacées" and "Roses," partly engraved in "flicks," short straight touches of the graver, and partly by the use of the roulette, a steel wheel with numerous points which pierced through the etching ground of the plate, before biting; then printed in colours and completed by washes in water-colour. But copperplates did not supersede woodblocks, as the latter method flourished at the same time, especially as it was cheaper to print, and could be set in the same pages as the text. Nevertheless, outline copperplates continued till well into the nineteenth century, when intended to be coloured, as in Curtis's "Flora Londinensis," the *Botanical Magazine*, and Sowerby's "English Botany," and similar serial works.

But besides cutting the design into copper at least three other methods were employed. Thus, John Martyn's "Historia plantarum rariorū," 1728, was illustrated by a process termed mezzotint. The usual method was to employ a tool termed a "rocker," curved on the surface, with sharp teeth which, when pressed on the soft copper, made numerous points on the metal, finally producing a velvet-like surface when printed. The engraver then proceeded to scrape and burnish each part which had to represent light, and gradually worked it up towards the finished surface. But in Martyn's work just mentioned the rocker was evidently small, and adapted only to roughen the leaves, stems, and flowers, the plates being completed with an engraving tool. These plates were printed in green ink, the roots and flowers being afterwards tinted in water-colour.

Another method was the use of "dry-point," where the needle was used directly upon the plate without a ground, to scratch the design by pressure and dragging, the process raising a burr alongside the furrow. This process had the disadvantage of giving comparatively few copies before showing signs of wear and deterioration; it was used by Dr. John Hill in several of his works, including his "The Vegetable System" in twenty-six folio volumes, issued in 1761-75.

Aquatint is a species of etching; the plate is covered with successive coats of resin dissolved in spirit of varying strength, which, drying, leave innumerable cracks which are bitten by the acid; high lights are first stopped out by varnish, and lighter portions treated in the same way in succession, until the last biting produced the deepest tint. Fine specimens of aquatint, fully completed by strong colouring in water-colour, are in Thornton's folio, "Temple of Flora," 1799.

The *Botanical Magazine*, founded by William Curtis in 1787, and still in progress, at the present time issued by the Royal Horticultural Society, began by using copperplate outlines coloured by hand; since the middle of the last century lithographic outlines give in simple manner outline for finishing by other means.

Lithography, just mentioned, differs from all other methods,
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in that the surface on which the design is drawn is practically a plane ; the medium employed receives either grease or water, but when so used each repels the other. The first application was by Alois Senefelder, a special limestone occurring at Solenhofen in Bavaria being used. Upon this stone, either polished for the use of lithographic "ink," or grained by rubbing two stones together with water and sand for the employment of lithographic "chalk," a compound of grease, wax, and lamp-black, receives the desired drawing ; it is then proved by being wetted with acidulated water and rolled up with printing ink, the process consisting of inking with a roller and moistening with a wet cloth between each print taken. Lithography has this advantage, that alterations can be more readily effected in the drawing by erasure, either with a knife or the use of snake-stone, and then redrawing when the surface is dry, than in any other of the processes here described.

Lithographic stones are cumbrous and heavy, and prepared plates of metal, as of zinc or aluminium, are frequently substituted when the work is comparatively simple.

A modification of the chalk or ink drawing on stone has been devised—that is, etching on stone, the latter being covered with an etching ground applied with a brush, and, when set, tracing the design through the ground and rolling up with printer's ink. The result is a delicate line drawing, as the needle can trace a finer line than the cut-sable used on a stone.

The above description refers chiefly to black prints, but, as flat spaces can be covered on the stone, chromo-lithography soon came into use, and by successive printings in different colours a fully coloured print was the result. Care has to be taken that accurate register is preserved, so that every tint falls precisely into its proper place. Usually a key plate is prepared, and a light grey impression pulled on transfer paper is impressed on as many stones as are needed, which are then filled up for the appropriate colour. When durable pigments are used, chromo-lithographs are more permanent than the outline hand-coloured plates.

The Japanese are accustomed to print objects of natural history in colour by the use of many woodblocks, the result, though flat, being fresh and pleasing, as in the case of a nurseryman's catalogue of varieties of *Iris Kaempferi* and other plants. The same artistic people frequently print a flat black to contrast with the outlines on the same plate, as shown in the "Kwa-wi" by Yonan-Si.

The first attempt at process was that termed "Ectypa"; the dried plant itself being inked, and a sheet of paper placed upon it, was subjected to pressure, and the ink was transferred to the paper as a black print. D. A. Hoppe issued a set of ectypa, 800 in number, in 1790-1811, of Regensburg plants, though naturally the same specimen would not last for the entire set of impressions, and the volumes would not be as uniform as if engraved plates were used.

A modification, if we may so call it, was employed by Henry

Bradbury (died 1860), known as "Nature Printing." His method consisted in placing the plant to be copied between a plate of steel and a sheet of lead, and subjecting these to hydraulic pressure, the result being that the fern or seaweed was pressed into the lead. After the object was picked out, the lead plate was electrotyped, details and lettering engraved on the copper, and printed in the colour of the original object. Bradbury's "Nature-printed Ferns" was issued in two forms, first in folio, with the text by T. Moore, revised by Dr. John Lindley in 1855, and afterwards in octavo in two volumes. Another and more extensive work was W. G. Johnstone and A. Croall's "Nature-printed British Seaweeds," in four volumes, in 1859-60, in octavo. This admirable process had the drawback that the specimens were destroyed in making the plates, and it could only be employed for such objects as were able to withstand heavy pressure.

In Britain Bradbury's process did not survive the death of the inventor, but a form of it, modified by Auer, the superintendent of the Staats Druckerei in Vienna, was employed for a series of years by Baron Constantin von Ettingshausen to show the nervation of leaves, as in his "Fossile Flora von Sagor" in the Vienna *Denkschriften* (1877); the leaves are printed in brown, but the numbers on the plates and headings were afterwards printed in from type. In the letterpress are inserted many small blocks of the nervation in white against a black background, by some galvanoplastic copy of the original leaden mould.

Woodburytype may be said to be a modification of Bradbury's process. A thick film of gelatine and a bichromate salt is exposed under a negative, washed with hot water, freed from unused portions, and again dried. It is now practically incompressible, and, placed in a steel box with a thick plate of lead above it, is subjected to a pressure of about two tons to the inch. This lead plate forms the matrix for printing; it is placed on the bed of a press with a hinged lid of glass, and, the face of the lead being slightly oiled, a small amount of warm gelatine, tinted as required, is poured upon it, paper placed upon it, and the lid shut down. In a few minutes the fluid gelatine has set, and on opening the mould the sheet of paper turns out with the impressed coloured gelatine, which, after immersion in a bath of alum to render it permanent, is dried, trimmed, and mounted, to form the perfect print. The slow printing and the need for every print to be mounted renders the process expensive.

I have now to describe the modern processes which have superseded the older methods and depend upon the action of photography. Passing by some of the earlier attempts which are now obsolete, I may mention Dawson's "Typographic Etching," in which a metal plate covered with a wax ground was drawn upon with a needle, as if for acid-etching, but the parts to be left white were covered with additional wax by melting a stick of wax with a hot rod, the names were impressed by type through the ground, the plate blackleaded and

electrotypes ; this resulted in a line block. The early form of half-tone was carried out in the Meisenbach process ; a negative was made by exposing a sensitive plate behind a screen ruled with lines averaging 120 to the inch ; when half-exposed the lens was covered, and the screen reversed and the negative completed. The negative was then employed as in the process to be described later.

Half-tone blocks show a ground round each detached figure ; this can be obviated by covering the completed work by varnish or wax and etching away the ground, the surroundings being then left white.

Taking the collotype or heliotype process as the oldest form, the fact that gelatine mixed with bichromate of potash, or other bichromate salt, becomes hardened by exposure to light, a plate of glass half an inch thick, roughened to hold the film, is coated with water-glass and the gelatine compound and dried in an oven. When dry it is sensitive, and it is then exposed under the negative, the margins being masked by strips of tin-foil, this printing requiring twenty minutes to half an hour. Next follows washing in warm water for thirty minutes to remove all traces of unhardened film, and it is then allowed to dry naturally. Printing is done in a lithographic press, the film wetted with a solution of salt, glycerine and water, which is allowed to soak in for a short time, then inked by a leather roller for the stronger parts of the picture, followed by a gelatine roller for the more delicate parts, and then pulled on ordinary printing paper. The film thus takes a graduated amount of ink, corresponding to the print from the negative. There is one drawback to this effective and beautiful process, and that is, no dependence can be placed on the durability of the film, which may break up in the press almost without notice ; consequently, the workman is obliged to have a second film in reserve, in case the first gives way ; another inconvenience is the length of time the collotype ink takes to dry on the print.

During the last decade of the nineteenth century, the *Gardeners' Chronicle* issued some whole-page plates by the Sprague "Inkphoto" process. The process does not seem to have been described, but it is evidently based on the collotype process. A strong solution of gelatine and bichromate, which produces a coarse grain, is used, and after exposure under a negative it is rolled up with printing ink and transferred to a polished lithographic stone, and printed as an ordinary lithograph. Lettering or numbering, as in ordinary collotype, has to be supplied by a second lithographic printing.

The swelled gelatine process is begun as if for a collotype, but instead of completing it as described above a wax mould is taken, blackleaded and electrotypes, which forms the actual printing surface.

The modern processes must now be considered. Taking first that which is known as line process, or zinco, by which pen drawings can be reproduced with excellent result, the camera is an indispensable adjunct,

in conjunction with the electric arc-light, as daylight, especially in London, is too uncertain. The drawing should be made with Indian ink upon Bristol board, and a dense negative taken from it. Although some firms make use of films, from their convenience, the old wet collodion process is still much employed ; it produces a dense negative, and in case of need the collodion film can be stripped and turned over. Other methods of obtaining the requisite reversal are by placing a right-angled prism in front of the lens, or focussing through the plate. The zinc plate to form the block is sensitized by a solution of bitumen in benzol floated over the plate, and distributed by clamping it to a whirling table which is set in rapid motion, producing a thin and equal film on the metal, or a compound of white of egg, bichromate of ammonia, and water may be used instead of the bitumen. This preparation must be dried in the dark, as it becomes sensitive when dry. The prepared negative is then placed over it in a photographic printing-frame, when a few minutes' exposure suffices to oxidize the albumen where the lines permit of the passage of light. The surface is then rolled up with printer's ink, dipped into a bath, and gently rubbed with cotton-wool, the unhardened albumen coming off, leaving the design on the plate in an insoluble condition. The back and sides of the plate are then varnished with a quick-drying varnish, and when dry the plate is etched for the first time in very weak nitric acid. Next the design is inked with a roller charged with printer's ink, and, whilst still wet, finely powdered resin or asphalt is dusted over the face of the plate, which is then heated so as to melt and cover the lines of the drawing with a protective resinous coating. In this way etching proceeds, the plan just described being repeated many times until the plate has been bitten to the required depth ; then the whole of the protection is removed, and merely the tops of the lines are re-inked, and a final immersion in the acid bath brings the whole of the lines into a true **V** shape. The last stage consists in trimming the plate with a revolving saw, mounting it on a block of bay-wood type-high, and routing the blank spaces, this being done by mechanical means as being quicker and cheaper than removing it by acid.

The drawback to this method is, that it can only be used in cases where the original is in positive black and white—in line or stipple ; it cannot represent gradation of tone. Photogravure, next to be described, does that excellently, but at heavy cost. A plate of polished copper is first prepared with a grain to receive the picture by the following method : A box containing powdered asphalt has its contents agitated by a rotary brush within it, as it were saturating the air in the box with a resinous dust ; after the lapse of a few seconds, to allow the grosser particles to settle, a door in the side is opened and the plate put in for a definite period, usually three minutes. When the plate is withdrawn, it is slightly heated over a Bunsen burner, so as to cause the fine particles of asphalt to adhere to the plate, but

not to run together. A somewhat similar effect may be obtained by spraying with a solution of resin in spirit, or a ground as in aquatint laid on with a brush, which on drying shrinks into innumerable tiny cracks. The picture is obtained from a glass positive, or more generally a carbon transparency is made from the negative ; this is put into the photographic printing-frame, then a mask to ensure clean edges all round the print, and above it another piece of carbon tissue sensitized with bichromate salts and gelatine, to form what is termed the gelatine resist. When finished, it is carefully pressed down upon the copper plate as above described, and placed in water, when the paper backing of the tissue can be removed, and the soluble gelatine washed off, leaving only the sensitized portion on the metal. The back of the plate is then coated with varnish, dried, and put into a bath containing a weak solution of perchloride of iron ; several bitings are required of various strengths, and the resources of the etcher are brought into play, such as stopping out to prevent further action of the etching solution, removing the ground in places for deeper biting, and the like. On washing off the protective film, the plate is proved by the printer. The process is costly, enhanced by the prints having to be printed by the process of copperplate printing.

Half-tone blocks are now employed to an enormous extent in place of wood engraving. The process to be described is founded on the Meisenbach method previously mentioned. The negative is taken with a screen of finely ruled glass, which is the key to the whole procedure. This screen is composed of two plates of glass, ruled by a diamond point with a machine, from 70 lines to the inch for newspapers, to 200 for finely illustrated books, but averaging 133 to the inch. These lines are filled with a black varnish, crossed, and cemented together with Canada balsam. This screen is placed in the camera between the lens and the sensitive plate ; it is capable of being moved forward or back so as to obtain the best result. The crossed lines break up the image into squares, which are represented on the plate as dots, the plate for etching being sensitized by a mixture of fish-glue, chromic acid, bichromate of ammonia, and water. From three to ten minutes under the electric arc-light suffice to print the picture from the negative, and then the unattacked albumen is washed off under a spray. At this stage the picture is almost invisible ; it is therefore dipped into a solution of methyl violet, which stains the film and brings up the picture. The plate is next heated over a Bunsen burner (the so-called "enamelling") till the picture becomes of a rich brown tint, when the heating is discontinued. It is then etched—if of zinc, with dilute acid, if of copper, for fine work, with perchloride of iron—then treated by stopping out with varnish, or cutting out the high lights, to obtain the desired effect. Mounting on wood, as previously described, completes the process. The etching takes place in a wooden trough, lined inside with pitch, which is kept rocking during the biting to get rid of the bubbles which arise from the action of the mordant upon the metal.

Whilst the screen produces the smoothest and best result, it is not indispensable. The original drawing is sometimes made upon paper with a specially strong grain, with the lettering and outline in ink, and the shading in lithographic chalk. This is then transferred to a lithographic stone, so as to preserve the actual drawing ; the rest of the process is effected as in line or half-tone blocks. It is a simple way of producing a given result, but as the work is shallow it is apt to become clogged in printing. There are many patterns of grained paper used for this method, according to the fancy of the draughtsman, but the coarser kinds make a clean outline or delicate lettering almost impossible.

Photo-lithography through a screen as in half-tone, transferred to stone and then printed as lithographs, is sometimes used for objects difficult to be drawn direct upon stone.

The "three-colour" process is carried out by means of three, or even four, half-tone blocks ; these are taken through coloured screens and printed in appropriate colours to form the finished picture. The usual method is to use a green filter for the "red" negative, a blue filter for the "blue," and a violet for the "yellow." In printing the yellow is first worked, then the red, and then the blue ; sometimes a black plate is used finally to bring up certain details. A set of filters lent to the writer requires the following exposures : blue, 1 ; green, 2 ; red, 12, for success. In printing, the dots must not be printed over each other, as that would produce muddiness of colour, but printed side by side ; the beholder's eye combines them into an harmonious whole. Much of the effect depends upon matching the colours according to the screens employed in making the respective negatives. Unfortunately the full effect can only be got by printing on art paper, which has a facing of China clay with size, and probably not permanent, although a highly calendered paper is sometimes used, and has a far greater promise of permanence.

The foregoing gives only the outlines of the various processes described ; had the machines been particularized, or the proportions of the reagents employed been given, it might only have bored the reader, who is not likely to take up any of these various methods for his own amusement. Skill in practically all of them is only attainable by devoting much time and labour to the craft.

Readers who are practically acquainted with modern methods of etching may demur to the account of that process detailed above, but the present-day processes of varnishing the back of the plate, using a bath of Dutch mordant, regrounding by the employment of a roller, and steeling the finished plate so as to ensure a large number of prints without serious deterioration, were not known to the early etchers.

THE SEVENTEENTH MASTERS LECTURE.

[Delivered by DR. A. B. RENDLE, F.R.S., V.M.H., March 29, 1923.]

WE associate the name of Dr. MASTERS with teratology—that is, the study and classification of those unusual appearances or departures from the normal (such as a green rose, or a double flower) which occur in plants and attract our attention by reason of their remarkable character. As regards the immediate cause of the abnormality, it is safe to assume that the constitution of the plant or organ concerned has been in some way upset, and this explains why malformations are more frequent in plants under cultivation than when growing wild; the upset is doubtless connected in some way with the supply of nutriment. SACHS suggested, and GOEBEL agreed, that the differences in the form of the organs of a plant are based on material differences, and that changes of organic form are connected with changes in the processes of nutrition. Hence the assumption by one organ, such as the petal of a flower, of characters which normally belong to a stamen results from a deviation from the usual path of the nutriment proper to each organ. Much has been written and many different opinions expressed as to the value which may be placed on malformations. The study of evolution may take into consideration the various kinds of plants: a burning question, for instance, at the present day is the origin of the flowering plants; they are the most recent stage in the evolution of plants, but whence have they sprung? How can we connect them with, or derive them from, the fern-like plants which were the dominant feature of an earlier vegetation? Or we may study the evolution of plant-organs—from what original organ has any given structure been derived in the course of evolution, and what are the changes through which it has passed?

In order to determine this origin we may study the development of the organ, on the view that the history of the individual repeats the history of the race. Or we may study the internal structure or anatomy, seeking to find in the arrangement of tissues suggestions of a former state. Or we may obtain light on the nature of an obscure structure by comparison with its form in an allied genus or species. Or, finally, we may employ teratology, and regard a monstrosity as representing either a reversion to some earlier form or an advance in development. Many botanists approach the teratological method with extreme caution, and there is every grade between those who regard a monstrosity as a meaningless freak and those, like WORSDELL, who see in it an important method in the study of the evolution of plant-organs. But, without committing ourselves to any extreme view, we must admit that in similar structures which are malformations in one plant have become the normal form in others, and

have often become adapted for some special purpose. It may be interesting to work this out in some plants with which you are familiar.

The ordinary green leaf consists of a stalk bearing a flattened expanded blade which is simple or branched in the same plane. The leaf-base often extends below the attachment of the stalk and, if the two edges join, a shield-like blade is produced, as in *Tropaeolum* or the Pennywort (*Cotyledon Umbilicus*) ; in the latter the centre of the blade is depressed, the whole forming a shallow saucer in which a drop of rain or dew may be held for a short time. An exaggeration of this will produce a cup form, and this type of leaf occurs frequently as a malformation, appearing in very different degrees of departure from the normal in many species of plants ; in extreme cases a pitcher is produced, and the malformations are known generally as *ascidia*, or pitchers. In some cases the interior of the pitcher is the upper face of the leaf-blade ; this occurs in the large-leaved Saxifrage (*Saxifraga ligulata*) and *Pelargonium zonale*. These were termed by CASIMIR DE CANDOLLE, who made a special study of the phenomenon, *epi-ascidia*. In *hypoascidia* the interior of the pitcher is the lower face of the leaf, as in the remarkable cornet-like leaves of *Ficus Krichna*, a form of *Ficus benghalensis*, in which all the leaves on the tree are affected.*

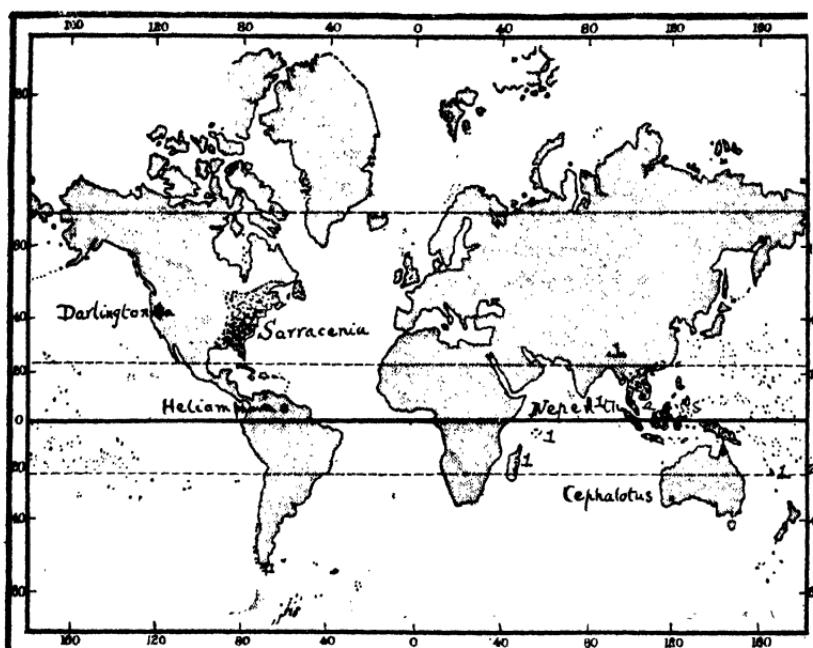
In the leaf of some insectivorous plants the pitcher is a constant character, and is adapted for the special function of obtaining nitrogenous food from the bodies of insects which are attracted to the pitcher and drowned in the fluid which is excreted in its interior. GOEBEL † figures a striking malformation in the bracts below the flower of a Cactus (*Phyllocactus crenatus*) which show a close superficial resemblance to the pitcher of *Sarracenia*, but lack the anatomical peculiarities which enable the latter to make use of insects for nutrition. The Sarracenias are natives of the Atlantic States of North America and occur plentifully in swampy pine-barrens where the soil is poor in nitrogenous material ; hence the advantage of the insectivorous habit.

Branches of the leaf may be produced on the upper or under face of the leaf, as in Moonwort (*Botrychium*) and Adder's-tongue (*Ophioglossum*), with which GOEBEL compares the development of a

* This remarkable fig is known only as a single tree occurring in a garden in the environs of Calcutta ; some young trees have been grown in the Calcutta Botanic Garden, from slips from the original tree. It is regarded by the people as sacred and as the result of a miracle. KRICHNA was sent as a child into the country by King KANSA owing to a prediction that the child would one day dethrone him. The boy was brought up by shepherds, who used daily to bring him butter in the leaf of a banyan, which they pinned together with a twig. On hot days the butter ran out, and to remedy this KRICHNA ordered this particular banyan in future to produce cornet-shaped leaves. CASIMIR DE CANDOLLE discussed at some length the systematic position of this remarkable tree. He argued that if it were merely a teratological development of *Ficus benghalensis*, or some other species, it is surprising that the phenomenon does not recur in these species. No example has been found, although the banyan and other figs have long been cultivated in India and other countries. He therefore preferred to regard it as a distinct species.

† *Organographie*, vol. i. p. 24.

pitcher-bearing branch on a cabbage leaf; this may arise either from the upper or the lower face. In a variety of Croton (*Codiaeum variegatum*) the outgrowth arises a short distance from the apex as a continuation of the midrib. With this we may compare the development in *Nepenthes*, where a pitcher arises from the leaf-apex as a fixed and normal character. Another adaptation occurs in the *Nepenthes* leaf—namely, the conversion of a part of the leaf-axis into a tendril-like structure by means of which the plant climbs on other vegetation and is enabled to present its pitchers in a favourable position. It



DISTRIBUTION OF PITCHER PLANTS ON THE SURFACE OF THE EARTH.

frequents the sides of streams where insects abound, and contains a number of species widely distributed through the Indo-Malayan region.

In *Cephalotus*, a genus represented only by one species, a small herb occurring in the marshes of King George's Sound, West Australia, the pitchers are distinct from the ordinary leaves; they somewhat resemble the pitchers of *Nepenthes*, but are much smaller and are arranged, together with the normal leaves, round the base of the flowering stem. The pitcher is a development at the tip of the leaf, as was shown by EICHLER.

It has been shown conclusively, both in *Nepenthes* and *Sarracenia*, that the liquid in the pitcher, which is secreted by special glands in the interior walls, contains an active ferment by which the proteids

contained in the bodies of the entrapped insects are rendered soluble, after which they are absorbed by the leaf. We cannot, however, assume that the presence of water-holding cups, in which insects are drowned and putrefy, implies of necessity a true insectivorous habit. For instance, the cups formed by the united leaf-bases round the stem of the Teasel contain water in which are found numerous dead insects which undergo putrefaction. But so far no satisfactory evidence has been produced that there is any excretion of a digestive ferment by the plant or any absorption of the products of digestion.

The pitcher-plants to which I have referred represent three families : (1) Sarraceniaceae, which includes, besides the genus *Sarracenia*, two others of similar habit—*Darlingtonia*, represented by a single species, *D. californica*, in the mountain swamps of the Sierra Nevada of Western America, and *Heliamphora*, known only by one species on Mt. Roraima in British Guiana. They are perennial herbs with a basal rosette of pitcher-leaves surrounding a scape which bears one or a few large flowers. (2) Cephalotaceae, which contains one species only, *Cephalotus follicularis*, of somewhat similar habit, but the pitchers resembling those of *Nepenthes* in general form. (3) Nepenthaceae, containing the one genus *Nepenthes*, of very different habit from the foregoing, consisting of shrubby climbing plants with elongated leafy stems, some of the leaves bearing at the tip the characteristic pitcher. There are sixty species widely distributed in the Indian Monsoon region extending from Madagascar in the east to the extreme north of Australia and New Caledonia in the west. The greater number of species occur in the Malay Archipelago.

It is generally agreed that these three families are closely allied, the characters of flower, fruit and seed, which are regarded as supplying the most trustworthy criteria of affinity, showing much in common. Such close affinity indicates origin from a common stock at some period, remote as we reckon time, but recent in the history of evolution of the flowering plants. The study of their distribution at the present day, as shown in the accompanying map, suggests a remarkable problem in geographical distribution. Dr. HANS HALLIER, who combines the three families in one—Sarraceniaceae—considers that it has been derived from the Helleboreae, a tribe of the family Ranunculaceae, which spreads right across the north temperate zone. Some such ancestry of the pitcher plants would account for their presence at the present day in both the eastern and western hemispheres. But their wide separation and the presence of several monotypic genera in isolated positions in Western America, British Guiana and West Australia, and the comparatively restricted area of the two larger genera, indicate how difficult are the problems represented by present-day distribution.

THE EIGHTEENTH MASTERS LECTURE.

[Delivered by DR. A. B. RENDLE, F.R.S., V.M.H., July 24, 1923.]

IN the previous lecture I took, as a special instance of the relation of plants to their environment, the development of pitcher-like structures from the leaf, and tried to show how different forms of leaf-pitcher, which had become highly adapted for the purpose of attracting, drowning, and digesting insects to be used as nitrogenous food, might be compared with the remarkable pitcher-like abnormalities which are occasionally found in individual plants.

I want to consider this afternoon other cases of adaptation to environment especially associated with what we understand as vegetative propagation, that is the spreading of any given species over large areas, and the formation of new individuals by other means than by the production of seeds. This is a wide subject, and one very familiar in our gardens, but we will consider some cases of special interest, of which I have been able to bring illustrative specimens.

The family of grasses is one of the most familiar, the most widespread, and the most useful to man. It evidently possesses characters which make for success in the struggle for existence, and have enabled it to become adapted to very different kinds of environment, though having a remarkably uniform plan of structure.

Let us glance at the general plan of structure of a grass, and especially its method of branching. The general form, or habit, is largely determined by the method of development of the branches in relation to the long sheathing base of the leaf. The bud arises at the node at the bottom of the sheath, and its growth may be *intravaginal*, pushing up inside the leaf-sheath, the branches thus giving the plant a tufted or tussock habit, characteristic especially of grasses covering large open areas in the warmer parts of the earth or in steppe-country ; this manner of development is also the cause of the tillering in cereals, where a clump of erect shoots arises from the originally single shoot which developed from the seed. If, on the other hand, the buds break through the base of the leaf-sheath, the branches are *extravaginal* ; in this case they may be short and form a densely matted growth, as in the turf-formation characteristic of moist temperate climates such as that of our own country ; or they may grow out horizontally as long thin stolons. An example of the latter, affording an interesting adaptation to a certain type of environment and one of great economic importance, is supplied by those grasses which act as sand-binders. I recently spent an afternoon digging out the grasses and other sand-binders from the edge of the shore at Studland, Dorset, and have mounted and brought some of the specimens. The edge of the shore here forms an interesting study

in ecology. Above high-water mark are tiny islands of sand in which the Marram grass (*Psamma arenaria*) has rooted ; behind is the edge of the beach where the sand forms a low cliff permeated in every direction by the long thin branching stolons of the Marram (note the pointed slender growing end of the stolon which penetrates the sand). This little sand-cliff is practically fixed by the grass and other sand-binders, but a strong wind will sweep portions of the front away, exposing a section, and thus demonstrating the wonderfully permeating character of the various stolons. Associated with the grass are a sedge, *Carex arenaria*, of similar habit, and a *Convolvulus* (*C. Soldanella*), also with a long creeping stem. Another species of the Convolvulus family, *Ipomoea pes-caprae*, is a most effective sand-binder on tropical strands. These sand-binders show a marked xerophytic character ; that is, are adapted for life under conditions where the water supply is very scanty ; and the long stolons are searching the sand to find water. The aerial portions of the plants are also markedly xerophytic in character ; the stiff slender stems and narrow leaves of Marram are glaucous in hue from a coating of wax, and the leaf-edges are rolled back, thus reducing to a minimum the loss of water from the under face. Compare with this the comparatively broad thin flat leaf of a shade-loving grass. The leaves of the *Convolvulus Soldanella* in their fleshy character also contrast with the thin membranous leaves of another more familiar species, the lesser Bindweed. Once the sand is freed other plants gain a footing ; and here creeping almost to the edge are stone-crop and other small plants which can succeed in the poor, dry, loose soil. A little farther back the heath vegetation begins, stretching over a considerable area and affording an excellent botanizing ground. Among other interesting plants is the Dorset heath (*Erica ciliaris*), which, however, seems to have suffered in the heath fires of last summer. The charming little *Pinguicula lusitanica* also grows in boggy spots.

Beyond the bay and the heath is the large expanse of Poole Harbour, where we may note another example of the binding effect of the grasses under very different conditions. This stolon-bearing habit in the seed-grasses, growing in the mud on the margin of fresh-water lakes, pools, streams, or sea-inlets, serves to preserve the shoreline or sometimes to encroach on the water-area. An interesting example is the remarkable spread in recent years of a grass, *Spartina Townsendii*, on various parts of the south coast ; and it may be seen in vigorous operation in Poole Harbour. Great patches of the grass are growing out into the shallow water, and the area of the harbour is being rapidly reduced. *Spartina Townsendii* is perhaps a hybrid between *S. stricta*, a grass of rare occurrence in muddy creeks and marshes on our south and east coasts, and *S. alterniflora*, which occurs only on the salt marshes of Southampton Water. The hybrid was first noticed in Southampton Water in 1870, and like other hybrids has a much more vigorous and aggressive constitution than either of its parents. It has already occupied large areas, not only in Southampton

Water, but on the muddy shores of other creeks and inlets from Sussex to Dorset. This grass, of which I have brought specimens from Poole Harbour, has a stout stem with stiff erect leaves, is attached by strong fibrous roots, and sends out long stout stolons in all directions, firmly binding the soft mud. The leaves offer broad surfaces for the deposition of silt from the tidal waters, and fragments of seaweed and other floating matter are caught and held by their stiff points. The compact growth prevents the removal of mud which has settled among it, and the level of the flat is thus gradually raised and eventually reclaimed from the sea.

A very different adaptation to environment is found in some grasses living on high mountains or under Arctic conditions where, owing to the shortness of the summer, there is a risk that the seeds may not have time to ripen. Entire spikelets or single flowers are transformed into small-leaved shoots, bearing at the base the beginnings of roots. These shoots fall from their axes and root in the ground ; and a very effective method of vegetative propagation thus replaces the uncertain method of seed-production. These are described as viviparous, a somewhat misleading term, as the phenomenon is not due to the germination of the seed *in situ*, as occurs sometimes in the wheat in very wet seasons, but to the conversion of the flower into a leafy shoot. Our common Sheep's Fescue (*Festuca ovina*) behaves thus on high mountains in the north, as also does *Poa alpina* ; and *Poa stricta* is invariably 'viviparous.'

The most perfect and the most remarkable adaptation to desert conditions is shown by the Cacti, which are almost exclusively inhabitants of hot arid regions in the New World, especially the Southern United States and Mexico. I have the opportunity of bringing a fine specimen from Jamaica, *Melocactus communis*, the Turk's Cap, one of a large number which have been sent over for the British Empire Exhibition at Wembley. The plant shows no trace of normal leaves, but the stout ridges of the stem bear clusters of spines, each of which may be regarded as representing an arrested branch. The internal tissue is mainly soft and acts as a reservoir of water ; the necessary rigidity is obtained from the turgidity of the tissues and the stiff outer skin which reduces loss of water by transpiration to a minimum. The ridge-and-furrow surface of the barrel-shaped stem allows a variation in the bulk with variation in the amount of stored water. The "Turk's Cap" is the upper portion of the stem on which the numerous small flowers are borne. The Cacti generally show remarkable powers of vegetative reproduction ; in branching species, a detached branch will readily root. The Prickly Pear has become a pest in Australia, and elsewhere where it has been introduced, owing to the ease with which any broken piece of the plant will take root. Even the fruit, if put in the ground, will send out roots from its base and produce a new plant.

SOME PYRENEAN PLANTS AT HOME.

By Sir ARTHUR F. HORT, Bt.

I CAN give no systematic account of the flora of the Pyrenees, since all my visits have been in April and my opportunities limited accordingly. The one year in which I have been out later (till the last week of May), the spring was also abnormally late, so that this visit is hardly an exception. Hence my experience has been almost entirely sub-alpine, and any alpine plants that I have seen in flower are such as descend to the sub-alpine region. I did once, it is true, climb a mountain 8,000 feet high, on which the snow had mostly melted on the south side, and found *Anemone vernalis* and *Primula hirsuta* in flower almost at the top. But that occasion was quite unique. My regular plan in these April tours has been to start at about 2,000 feet, and move up, according to the season, to about 3,000 feet, or occasionally higher. It is as impossible in the Pyrenees as it is anywhere else in Europe to know what to expect in April till one is on the spot. Thus, having once revelled in flowers at Mont Louis (5,280 feet), I tried it again a few years later at the same season, and found the wintriest conditions—storms of snow and sleet, and drifts many feet deep in the streets of the little town. One year I went to Arreau (2,290 feet), in the Vallée d'Aure, near the Col d'Aspin, and beheld the full glory of gentians, daffodils, fritillaries, and other delights ; in 1922 I arrived there in the last week of April—simultaneously with a heavy snowfall which buried whatever flowers there may have been under several blankets, and made all walking impossible except a constitutional along the roads in ankle-deep slush. As to snow, two distinct possibilities have to be reckoned with : there is that of a late melting of the winter snow and that of a late fall in spring. The former contingency means a lower altitude, the latter the exercise of patience for, it may be, some four or five days, after which there is often glorious weather. I remember such a fall followed by ten days of cloudless sky, when flowers came with a miraculous rush : of course the southern sun makes quick work. With these cautions I heartily recommend the lower Pyrenees in April and early May to any flower-lover who is not daunted by occasional bad weather. The Pyrenean "season" does not begin till at least mid-June, when the almost ubiquitous bath establishments draw crowds of fashionable folk. At such times resorts like Luchon or Bagnères-de-Bigorre must be intolerable to any but those whose ideas of the joy of the mountains are bounded by casinos and motor drives. But in spring the unfashionable tourist can enjoy these admirable "centres." A botanizing tour in the High Pyrenees in July would be full of interest ; but the difficulty is that above (say) 3,000 feet there is hardly anywhere to stay. Climbers' inns are almost unknown : there is, so far

as I know, nothing corresponding to the Riffelberg or Saas or Zinal ; a vast majority of the visitors go simply for "cures," and the health-resorts are nearly all sub-alpine. Hence in summer the best, if not the only, way is to take a mule and a tent, and camp. This is the method taken for granted in Mr. BELLOC's charming book "The Pyrenees."

It is then of fickle April only that I have to tell, and my recollections are mainly of woods and low pastures, with occasional excursions up to higher and wilder alps. Ideally the flower-hunter should be a geologist. My knowledge of that science is vague and elementary. In the course of exploring a good many valleys I have learnt to make just the broad distinction between limestone and "granite": in many cases it is probably not granite, but anyway it is not limestone. A friend of mine, when challenged to identify a formation, is accustomed to suggest learnedly "mica-schist"; my use of the term "granite" is perhaps equally wide. It is a commonplace that a granitic formation presents a far less varied flora than a calcareous one : one seems to see the same limited series endlessly repeated.

Bearing this important distinction in mind, I may take as a basis of arrangement for these notes a rough classification by habitat—plants of the woods, plants of the meadows of the valley bottom, plants of alp and rock ; but of course there will be overlapping, and sometimes it will be convenient to take plants of the same genus together, even though they grow under dissimilar conditions.

Plants of the Woodland.—A Pyrenean wood in April is not so very unlike an English one, but "primrose" and "bluebell" will not have the same denotation. The English primrose is extremely rare, its place being taken by *Primula elatior*—a plant of the woodside rather than the wood. So again our beloved bluebell is rare, confined, according to Philippe's Flora, to the Central Pyrenees ; I have never come across it. In most districts it is replaced by *Scilla Lilio-hyacinthus*, the masses of whose broad, glossy leaves make a brilliant carpet, though the flowers never produce the (surely unsurpassed) effect of *S. nutans* in an English oak coppice. With the squill is often seen *Dentaria digitata*, whose rather violent colour is effective in the shade. Some beech-woods are carpeted with the dainty *Isopyrum thalictroides*, growing in sheets where nothing else thrives ; it flowers, however, more freely at the edge of a wood, or under a large boulder. *Anemone nemorosa* is as common in most woods as in England. I have collected a fine strong-growing blue form in the Basque country, where it grew in patches and the type was nowhere to be seen. There are blue forms also in the woods of the Pène de Lhéris, an interesting isolated mountain near Bagnères-de-Bigorre, whose flora is specially commended by Baedeker ! *A. Hepatica* is extremely abundant ; white forms are perhaps the commonest, some being very superior to others ; next in frequency come rather washy blues, pinks, and lilacs ; a good deep blue stands out here and there, and rarest of all is a good rose. *A. ranunculoides* inhabits the edges of woods and dampish meadows. *Lilium pyrenaicum* is a plant of woods,

dense or open. Some bulbs which I heartlessly uprooted, just as they were coming up, in a wood near Ax-les-Thermes have thriven and increased, and this appears to be a specially fine form, with striking foliage—at least the late Mr. ELWES begged a bulb from me.

Plants of the Meadows.—With the sub-alpine meadow there is of course nothing in this country to compare. In the Pyrenees the meadows on a steep slope—and that is the prevailing type—are irrigated by little channels of water drawn off from the stream; the borders of these rivulets make brilliant “bog-gardens” in April. There are the familiar marsh-marigold and cuckoo-flower, but to these may be added colonies of our rarer natives: *Primula farinosa* (sometimes at least 9 inches high), *Gentiana verna*, and *Pinguicula grandiflora* (Irish, if not British). The meadow itself may be a cloud of soft grey-blue with a squill, which I suppose to be a form of *Scilla italicica* (though the books do not recognize this as a Pyrenean), with here and there a crimson orchis. In one corner may be descried the curious brown-chocolate bells of *Fritillaria pyrenaica*, perhaps less beautiful than our own *F. Meleagris*, but a weird and fascinating flower; the inside of the bell varies from a strange olive-green to a rich yellow. In one valley at least—that which leads up from Lourdes to Gavarnie—the exquisite *Hyacinthus amethystinus* grows along with the squill, and with the dainty and fragrant *Narcissus juncifolius*.

The mention of this brings us to the Narcissi, most conspicuous of all the flowers of the spring meadows, though by no means confined to them. Some competent botanist ought to make a fresh study of the Pyrenean Narcissi; I can only attempt to name them with much hesitation. *N. pallidus praecox* takes its English name from Bayonne at the western end of the chain, but it occurs at intervals all along it. Like so many Pyrenean plants, it varies astonishingly in size and form; it grows in such places as the “Lent lily” would choose, and is perhaps seen at its best perched on the rock ledges above a torrent. I was warned by a great daffodil expert that this species does not take kindly to cultivation; perhaps he expects more of a daffodil than I do; at all events the handful of bulbs which I brought home a few years ago have multiplied exceedingly by off-sets and self-sown seed, and I counted 300 flowers this spring. If *N. pallidus praecox* is variable, *N. variiformis*, true to its name, is a very Proteus. The *locus classicus* for it must surely be some fields near Arreau, where hardly two clumps are alike: some are bicolours, some self-coloured, and the trumpet, usually wide-mouthed, is sometimes almost “entire,” sometimes elaborately frilled. In some valleys there are acres and acres of daffodils which are not *pallidus praecox*, and presumably not *variiformis*. I can only class them tentatively as forms of *Pseudo-narcissus*. I have collected a form which I call privately *praecoccissimus*, as it usually flowers before even *pallidus praecox*. *N. muticus* is easily distinguished; this is the last of the trumpets to flower; in broad masses it makes a picture, though the typical flower, with its over-long stove-pipe trumpet, is less pleasing than the others. But this species, too, varies considerably, and by

diligent exploration of a field one may light on symmetrical and beautiful forms. *N. poeticus* is not generally out till May, but in one early season I had the fortune to see the fields beginning to whiten with it. Here too was interesting variation: on some plants the flowers were $2\frac{3}{4}$ inches across, on others diminutive, and these differences have proved constant in plants transported to my garden. Here and there was to be seen a yellow "star," presumably derived from *N. poeticus* crossed with late flowers of *N. pallidus praecox*.

Plants of Alp and Rock.—The gentians would seem properly to belong to this class, but two at least of the three of which I have to speak inhabit the lush meadows as well, or at least the drier parts of them. *Gentiana pyrenaica* is confined to the Eastern and Central Pyrenees, and is very local; but, where it occurs, the turf seems to be made of it. For instance, there is a moorland stream near Mont Louis, whose banks must be purple with it in May. It flowers a little later than *G. verna*. I have found it difficult to cultivate, and fancy that I am not alone in this experience; like some others of its tribe, it likes to lose its roots in a peaty mass of the roots of other plants. I have kept it for a year or two, and even flowered it; I remember the late Mr. FARRER going down flat on his front in my garden to look at the five-notched trumpets of rich Tyrian purple. Philippe's *Flore des Pyrénées* says "bleu d'azur," but this is entirely misleading. This book, by the way, published at Bagnères-de-Bigorre in 1859, is a useful guide, but it is far from complete or up-to-date. I also possess a Flora by Zetterstedt of Uppsala, published at Paris in 1857; I value my copy, because it was given me by the late Canon Ellacombe, but the book is even slighter than Philippe's; thus it gives only one locality for *G. pyrenaica*, whereas Philippe gives six; to which I can add three—two in the Ariège Valley, the Pic Saquet near Ax-les-Thermes and the Col de Puymorens, and the Port de Saleix near Aulus, also in the department of Ariège.

The form of *Gentiana verna* seen everywhere is, I believe, that distinguished as *angulosa*, which is of stronger growth than our native of Teesdale and Co. Clare. As in the Alps, it is extremely common and has a wide range of altitude; in April it is in full glory at about 2,500 feet. With it in the short turf is sometimes associated *Polygala calcarea*, which makes almost as vivid patches of blue. In most localities that I know the gentian is of the typical blue, but in one or two places I have found colour-forms of every shade of blue down to the lightest "Cambridge," and occasionally a pure white. These colour-forms do not seem to be so robust as the type, on a plant of which 40 or 50 flowers can sometimes be counted; one transplanted to my garden flowered itself to death with a display of sixty. I have never seen a big clump of lightest blue or white.

The big spring gentian of the Pyrenees is, I feel sure, *angustifolia*. It is well known that Linnaeus' *acaulis* covers at least four species. Some years ago I sent a plant of the Pyrenean species to Kew, where it was identified with *excisa*. But, if one may dare to question Olympian authority, according to a careful note by M. CORREVON, in

The *Garden* for March 11, 1922, *excisa* (= *Kochiana* = *latifolia*) is granitic, and is not stoloniferous, making small patches 4 inches across, whereas *angustifolia* is calcareous, and very stoloniferous, making large tufts sometimes 3 feet broad; moreover the flower stem is sometimes 8 inches long. This description of the species which M. CORREVON calls "the king of them all," and which is supposed to be the "gentianella" of gardens, exactly fits the Pyrenean plant. It is of course a pasture plant, but it grows also in crevices of limestone rocks, whence it hangs in huge loose mats, and looks strikingly different from the compacter clumps growing in the turf at the foot of the cliff. I have never seen a purple or white form, but there is a wondrous range of blues. As a hint to gardeners, I may recall an old wall, terracing a field, which was hung with this gorgeous flower mixed with *Saxifraga granulata*; huge oxlips lined the base of the wall.

At the comparatively low level of alp of which I am speaking a certain number of true "alpines" may be found in flower, as well as the gentians. In the turf *Crocus vernus* may be up, in many shades, from purple through lilac to white; also *Soldanella montana* and *Ranunculus pyrenaeus*: all these appear almost as soon as the black squidge left by the melting snow turns to green. The leaves of *Crocus nudiflorus* will be discerned almost everywhere; this plant, which descends to about 1,500 feet, is extraordinarily common: as a friend of mine once remarked, you cannot dig up a hepatica root anywhere in the Pyrenees without bringing up its curious stoloniferous corms. On the cliffs which rise from the alp, or on the great boulders which diversify the slope, glitter the great stars of *Saxifraga longifolia*, sometimes fully 9 inches in diameter. This is a particularly interesting plant to collect, and, as most of the stars are almost as inaccessible as those of the firmament above, one need not fear to deplete the stores of Nature. The prudent collector will of course only take quite small rosettes, and, when these are grown on in his rock garden, he will find (at least that is my experience) that a certain proportion of them produce off-sets, showing that they are hybrids; the pollen was doubtless provided by the omnipresent *S. Aizoon*, and, as some of these hybrids may have the *longifolia* character predominating, one may get fine forms which can be increased without seeding. *S. media* I have found but once, in the Aulus Valley (Ariège); the silver rosettes with crimson stems and flowers were a notable sight in the cracks of a boulder. Where I saw it, nearly every rosette was flowering, so that it was not easy to secure plants for future use. On other boulders near by were numerous interesting yellow-flowered Saxifrages, which I could only guess to be hybrids between *S. media* and *S. arctioides*; but I did not that day identify *S. arctioides* itself. This latter species I have found abundant in a deep water course of the Lhéris, seldom, if ever, reached by the sun. The Pyrenean Saxifrages surely need fresh investigation. To Mr. IRVING's useful monograph on the genus is added a chapter by Mr. J. H. SALTER on "The Saxifrages of the

Pyrenees." "They present," he says, "problems as perplexing as any with which the student of this fascinating family is confronted." Of *S. Aizoon* it need only be said that it is everywhere; some forms are very floriferous, and can hold their own in the rock garden against some of the most valued garden hybrids. *S. Cotyledon* I have seen but once; PHILIPPE says it is common on granite, presumably in the higher ranges. The form that I have seen (and annexed) seems to me extremely fine, but I have not had an opportunity of comparing it with wild plants from the Alps. *S. oppositifolia* hangs in crimson sheets from many a wet rock; *S. retusa* I have not myself seen growing. Mr. SALTER says that "report speaks of *S. rotundifolia* in the Eastern Pyrenees"; PHILIPPE gives half-a-dozen localities, and I can answer for it that it abounds in rocky woods near Ax-les-Thermes. As to the "mossies," many species of this class have come in my way, but I can make no attempt to name them or the almost equally baffling representatives of the *umbrosa* section.

To return to the rocky alp—the conspicuous Primulas are *hirsuta* and *integrifolia*, both widely distributed. The former lights up, for instance, the dreary wilderness of rocks, called locally a "chaos," on the road to Gavarnie; there I marked down a white form. *P. integrifolia* is, in spring at least, a real lover of moisture; if you gather a tuft, you can wring the water out of it. It is often seen hanging over the bank of a stream; it occurs also in quite thick woods.

Of all Pyrenean plants *Ramondia pyrenaica* is perhaps the best known. On the rocks which it colonizes it fills every cranny on the north side; there will be not a trace of it round the corner. This plant is a good doer in many English gardens: I have even seen it thriving when planted horizontally on a bed of clinkers; but few can reproduce the effect of a cliff, 50 to 100 feet high, whose every chink is purple with the flowers.

Few of the plants which I have mentioned will be unfamiliar to readers of this JOURNAL; the charm of the spring flora of these glorious mountains lies in the wild profusion with which most of them are displayed. Add to this the freshness of beeches just in leaf and steep woods white with cherry blossom.

Let me end these rather haphazard and, I fear, egotistic jottings with a sigh of regret over one vanished treasure, possibly a species not yet recognized. Once on the lower slopes of the Canigou I found an otherwise bare stretch of moor pink with the pin-cushion of the daintiest *Androsace*. I sent a plant to Prof. BAYLEY BALFOUR, but even he could not identify it. It thrived fairly with me on a "moraine" for a space, and even sowed itself about; but there came a droughty summer and I knew it no more. The moor in question is above Prats-de-Mollo; you would naturally cross it in walking thence over a low pass, Junon to Py, above the valley which runs up from Vernet-les-Bains to Mont Louis. And if, with this guidance, any reader should find my lost *Androsace*, he could perhaps spare me a cushion without fear of exterminating the species.

PRELIMINARY EXPERIMENTS IN THE CONTROL
OF SLUGS.

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THE following is a summary of some observations made and experiments conducted at the instigation of Mr. J. S. F. FRYER, to whom many thanks are due for valuable advice and suggestions. The work was carried out at the Pathological Laboratory, Harpenden, with a view to throwing further light on the constantly recurring question as to the best means of dealing with slug infestations.

At present none of the methods advocated is very satisfactory; and while these observations cannot lay claim to being very comprehensive, they do at least suggest a line of action which appears to be worthy of further investigation—namely, the use of some simple chemical as a contact poison—and at the same time they show that the habits of the slug seem to preclude the possibility of obtaining really effective control by means of poisoned bait, which was at first hoped would be practicable.

Fourteen species of slugs occur in Britain, and, while the life histories of all bear a marked similarity to one another, two species only, namely *Agriolimax agrestis* and *Arion hortensis*, occur frequently in sufficient abundance as to constitute pests.

Experiments were first conducted in an endeavour to determine to what extent deliberate selection—as opposed to mere chance wandering—influenced the choice of any particular food.

A very simple piece of apparatus, consisting of a cheese-tub 16 inches in diameter, was used in the first series of experiments. This tub, one of those used previously in the cutworm investigations (*Ann. App. Biol.*, vol. x., No. 2, 1923), was divided by means of three partitions into compartments having a common opening at the centre—two of equal size and one smaller one. This is more readily understood by reference to the sketch (fig. 35). The baits to be compared were placed in the two larger compartments and the slugs released in the small one. The slugs were on each occasion released in the evening and a count of the numbers on the respective baits taken on the following morning. This mode of procedure gave fairly satisfactory results, the main disadvantage being the fact that it was conceivable that a slug, having fed in one compartment, might crawl into another before settling down to rest.

A large variety of substances and plants were used, but although these first experiments gave some indication of a marked preference for certain baits, later experiments—to be discussed subsequently—lead one to conclude that too much weight should not be attached to this fact, as a plant which is very attractive on one occasion may be

almost entirely neglected on a subsequent one, the converse being equally true.

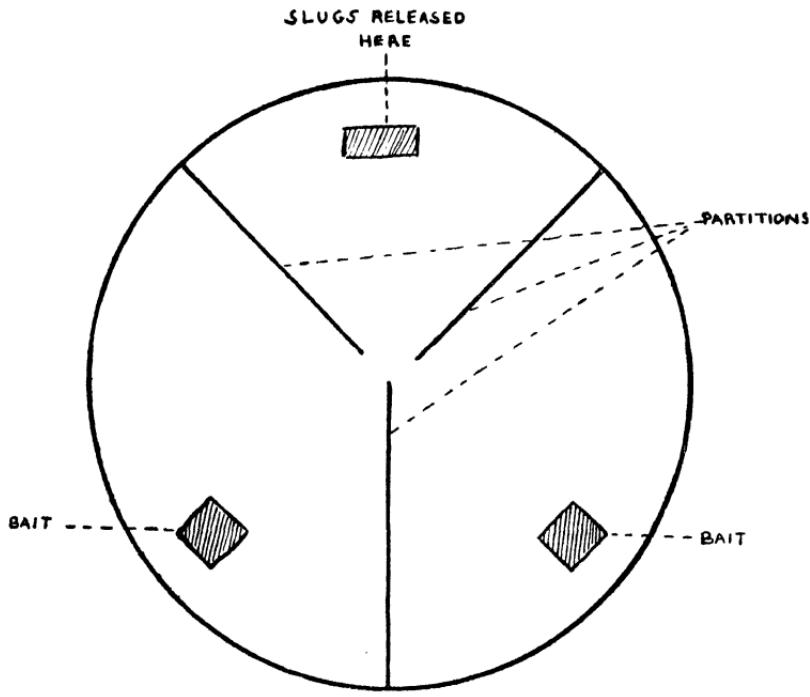


FIG. 35.

FOODS CONTRASTED.

Species.	Bran. No. at.	No. at.	Total Number of Slugs.	
			Counted.	Used.
1. <i>Arion hortensis</i> . .	26	Cabbage	15	41
<i>Agriolimax agrestis</i> . .	6	"	25	31
2. <i>A. hortensis</i> . .	10	Lettuce	35	45
<i>A. agrestis</i> . .	15	"	25	40
3. <i>A. hortensis</i> . .	52	Bran and orange juice	29	81
<i>A. agrestis</i> . .	44		26	70
4. <i>A. hortensis</i> . .	55	Bran and aniseed	—	55
<i>A. agrestis</i> . .	24		—	24
5. <i>A. hortensis</i> . .	28	Bran, sugar, and beer	12	40
<i>A. agrestis</i> . .	27		12	39
				45
				44

The specimen table given above was taken from the first series of experiments, being selected as typical of the results obtained

Incidentally it may be noted that the tastes of the two species do not appear to be identical.

As will be observed, plain bran, freshly moistened, was used as the alternative bait in each case.

Each of these experiments was repeated several times and no serious discrepancy in numbers occurred on any occasion. Slugs which had not left the introducing compartment or obviously had not fed were not included in the count.

As previously mentioned, the chief drawback to the apparatus employed was the facility with which a slug, if so disposed, could crawl from one compartment to another after feeding. It was therefore decided to construct a large box having a central chamber leading to compartments—two at each end—which could be closed mechanically, by means of trap-doors, at any desired time, the closing and timing being arranged by utilizing the mechanism of an alarm clock.

Observations showed that the slugs, if released in the centre chamber at dusk, approximately 6 to 6.30 P.M. at that time, were very soon on the move, many reaching the food placed in the end compartments within half an hour and the majority of them by 10 P.M. The shutters were timed to fall at about 11.30 P.M. on most occasions, thus leaving an ample time margin. On the few occasions on which the shutters failed to work the relative numbers at the food in the morning seemed to be unaffected, which fact rather points to the results in the first series of experiments being less prone to error than was at first thought to be the case.

Below is given a summary of some typical results obtained in these experiments. *Agriolimax agrestis* only was used in this series, as it was found that when two or more species were confined together a certain amount of cannibalism invariably occurred.

Foods contrasted.	Number of slugs at each on five consecutive mornings.					Total number at each.
Bran	7	2	7	9	6	31
Lettuce	16	15	24	27	10	92
Delphinium	9	3	5	6	12	35
Cabbage	11	1	3	3	14	32

The experiments were then repeated, an empty compartment being substituted for the one containing bran.

Foods contrasted.	Number of slugs at each on five consecutive mornings.					Total number at each.
Empty compartment	7	9	8	6	8	38
Lettuce	23	11	4	10	13	61
Delphinium	3	11	12	11	14	51
Cabbage	7	8	9	16	11	51

Close observation cannot but convince one of the fact that a slug will make practically a bee-line for a food plant, even from a distance of 18 inches or so, provided that it is sufficiently hungry.

One of the chief difficulties met with in all these experiments was the fact that fresh slugs were necessary each time, as one good feed seems to satisfy requirements for several days. The slugs were always starved for twelve hours before being used, but even then, as may be seen from the last table, a fairly high percentage made for the empty compartment when this was substituted for the one containing bran, which suggests that they were already replete.

Apart from the results shown, many flavouring materials were used in an endeavour to make the bran more attractive, but in every case the slugs came more readily to the plain unflavoured substance.

Plants sprayed with any distasteful substance were entirely avoided, provided that a more palatable meal was available. This fact, however, is of little control value, as frequent and repeated applications would be essential to ensure immunity from attack. Coupled with this is the further fact that the slug is an intermittent feeder, not very discriminating as to the plant attacked. This intermittent and selective feeding character also precludes the possibility of obtaining a high percentage mortality by the use of a stomach poison.

In periods of drought, the very period during which a poison will remain effective for a maximum length of time, very little feeding is done, it being apparently not unusual for the creatures to fast for stretches of from five to ten days at a time even during the summer months, coming out to feed after the first shower, which has diluted if not entirely washed off the poison. A further factor is that a poison requires to be of very fairly high concentration to be effective against a slug.

It seems therefore as though the only control method likely to prove really efficient would be a contact poison.

However, there is a difficulty in relation to contact poisoning not met with when dealing with insects. The slug by rapid secretion of mucus over its entire surface is enabled to slough off and crawl clear of most irritant substances. Unless, therefore, such a substance had some impeding action on slime secretion, or was applied repeatedly at short intervals until the slug was exhausted, which is hardly practicable, no permanent effect could be hoped for.

With a view to finding some such substance a number of preliminary experiments were carried out.

The slugs to be treated were placed on damp sand in large glass vessels and kept under observation until they either expired or recovered. In some cases the substances were sprinkled in the form of powder and in others sprayed as a fine mist, generally as a 10 per cent. solution in water. A list is here given of the principal substances used, together with notes as to mode of application and the effect upon the slugs.

Substance.	Form.	Effect.	Notes.
Borax . . .	Powder	Extremely lethal	Useless, as it would destroy vegetation
Dichlorbenzene . .	10% solution	No effect	—
Potassium bichromate .	10% solution	No effect	—
Potassium xanthogenate	Solution	Irritant	Slugs ultimately crawled clear and recovered
Sodium fluoride . .	Powder	Very lethal }	Selected for further trial
Copper sulphate . .	10% solution	" Irritant "	As in potassium xanthogenate
Derris . . .	Powder	No effect	—
Mustard (Brown) .	Solution	Irritant }	Gas rapidly fatal in confined space
Aluminium sulphate	Powder	No effect }	Selected for further trial
	10% solution	2nd application fatal }	—
Sodium silicofluoride	Powder	Very lethal }	—
	10% solution	4th application fatal	Concentration required too high for economic use
Chloral hydrate . .	10% solution	No effect	—
Sodium hyposulphite .	10% solution	Irritant	Slugs eventually recovered

Sodium fluoride and aluminium sulphate were selected as being worthy of further trial, both these substances having a strong coagulant action on the slime.

Sodium fluoride, while being very lethal when used at fairly strong concentrations, had a very strong scorching effect, and it was not found possible to obtain a working strength innocuous to foliage with which it came in contact.

Aluminium sulphate, the use of which was first advocated by DURHAM (*Gardeners' Chronicle*, July 24, 1920), is a cheap and easily obtainable substance, and, while not ideal, does give some measure of success as a control.

As in sodium fluoride, strong solutions have a scorching effect, and at less concentrations, while non-injurious to more hardy foliage, they are still likely to injure delicate plants or seedlings.

This difficulty was overcome by using an admixture of lime—on the lines advocated in some recent American work on Insecticide-Fungicide combinations (KELSALL, *Chemical Abstracts*, vol. xv., No. 2, 1921). The addition of lime, while reducing the liability to scorch and at the same time imparting a high adhesive property, does not detract from the slugicidal value of the spray.

After considerable trial, the most convenient working strength was found to be at the rate of 1 lb. of sulphate to 5 gallons of a saturated solution of lime in water. In making, $\frac{1}{2}$ lb. of good quicklime may be added to 4 gallons of water. After slaking has been completed and the water has become quite cold, the clear lime-water is poured off from the excess of lime, which will have sunk to the bottom of the vessel; 1 lb. of aluminium sulphate is then dissolved in 1 gallon of water and the two solutions are mixed, when a gelatinous precipitate of aluminium hydroxide, together with a certain amount of calcium

sulphate and a preponderance of free aluminium sulphate, is obtained.

The mixture should be strained through a fairly fine mesh, as the solid substance present, particularly any lumps of undissolved lime, naturally tends to choke the nozzle of the sprayer.

The spray may be applied by means of an ordinary power sprayer and is not likely to scorch delicate foliage. Care should be taken to wet thoroughly the soil below and around the plants. The most advantageous time to spray is shortly after sundown, or after a shower—that is to say, when slugs are most likely to be astir. In the experiments a thorough wetting with the spray at this concentration proved fatal to the slug. Individuals sheltering at the base of the plants were not actually killed, but would not touch foliage so sprayed, and, being unable to crawl far on surrounding soil, eventually perished. Several applications at intervals of a few days have been found to destroy every slug on an area so treated. It is hoped to embody experiments conducted on a somewhat larger scale in a further publication on the subject at some date in the near future.

CONTRIBUTIONS FROM THE WISLEY LABORATORY.

XLII.—*THEREVA PLEBEIA L.* AS A PEST OF ECONOMIC IMPORTANCE.

By G. FOX WILSON, N.D.H., F.E.S., Entomologist.

DURING the last eight years it has occasionally been reported that the larvæ of a two-winged fly (called locally "the white wireworm"), belonging to the family Therevidæ, attacked plants, especially vegetables.

Most authors state that these larvæ feed either upon dead and decaying vegetable and animal matter or upon other insects; but recently conducted field and pot experiments have conclusively shown that they may feed upon living plants provided that the soil has a low humus content, that is, that it contains very little decaying vegetation, such as leaf mould, weeds, and turf.

The larvæ of *Thereva* species have been recorded as being injurious to garden vegetables in Kent and Hampshire by THEOBALD (1922), and to rye in Silesia,* and the following species have proved to be of economic importance—the larvæ of *Thereva nobilitata* Fabr. attacked rye in Pomerania † and *T. plebeia* L. attacked cabbage plants and potato tubers at Wisley.‡

The usual habitats of *Thereva* larvæ are in soil and sand and decomposing wood. There they feed upon other insects, vegetable matter and dung.§ MALLOCH|| found them in wheat fields and woods, preying upon various insect larvæ, including wireworms, and they are even cannibals when overcrowded and lacking other food.

Many other dipterous larvæ will act in a similar manner and change their diet completely when normal food is short. This alteration in food habits is well known in the case of larvæ of St. Mark's Flies (*Bibio* species) and certain midges (*Orthocladius* species).

The adult flies somewhat resemble the predaceous Asilids in their flight, which is apparently erratic, short and, occasionally, very swift. They are active during sunny weather, and were often found resting on the sandy soil of the plots referred to below during June and July, but quickly taking to flight when disturbed. Some authors record that they visit flowers, but they were never observed to do so at Wisley. The shortness of their proboscis suggests that, if they are flower-

* OBERSTEIN, *Zeitschr. f. Pflanzenkr.*, Stuttgart, xxvi, 1916, pp. 277–280.

† KLEINE, *Zeitschr. f. angew. Entom.*, Berlin, iv. No. 3, 1918, p. 373.

‡ G. FOX WILSON, *Entomologists' Monthly Magazine*, 3rd Ser., No. 109, Jan. 1924, pp. 16–17.

§ S. W. WILLISTON, *Manual of North American Diptera*, 3rd edit., 1908, p. 206.

|| J. B. MALLOCH, *Bull. Illinois State Lab. Nat. Hist.*, vol. xii. Article III. March 1917, pp. 396–98.

visiting, preference would be shown for the shallow florets of umbelliferous flowers, which attract numerous species of short-tongued flies. WILLISTON suggests that they lead a predaceous life like the robber- or assassin-flies (*Asilidae*), and that their food is chiefly composed of other diptera, for which they lie in wait upon plants or upon the bare ground.

The act of egg-laying was never seen in the field, possibly because the flies are so easily disturbed, and they never laid eggs in captivity.

The first indication of this insect being troublesome to crops was in the autumn of 1921, when spring cabbage plants (var. 'Early London') were seriously attacked by surface caterpillars, two species being implicated—turnip moth (*Agrotis segetum* Schiff) and heart and dart moth (*A. exclamationis* L.). In addition to these caterpillars numerous *Thereva* larvæ were present. It was thought that they might be feeding upon the decaying vegetation resulting from the *Agrotis*-attacked cabbages; but when several plants wilted and died without *Agrotis* larvæ being present, and showing far different symptoms from those produced by their attack, then investigations were made as to the cause of damage. On examining several plants, it was found that two or three *Thereva* larvæ had penetrated into the tissues in a similar manner to the larvae of the cabbage-fly (*Chortophila brassicae* Bouché.) with the result that the attacked plants wilted and died.

During potato-lifting in October 1921 several tubers were found to have been penetrated by *Thereva* larvæ, and the damage resembled wireworm attack.

Although isolated specimens of these larvæ are found in different parts of the garden every year, it was very noticeable that they occurred in numbers only on the land that contained very little organic manure and was of a very sandy nature.

An analysis of the soil gave the following percentages :

	Per cent.
Moisture	0·502
Organic matter	1·529
Carbonates (CaCO_3)	Nil
Nitrogen	0·043
Gravel, Sand, &c.	94·862
Clay	3·107
	<hr/>
	100·043

It will be seen that the moisture, organic matter, and nitrogen in the sample were all very low.

Experiments were not commenced until 1922, but during October and November 1921 several larvæ were collected and placed in 8-in. pots and caged in order to breed out the adult flies. In these preliminary investigations no food plant was provided, but generous proportions of leaf mould were added to the soil, on which the larvæ fed. They pupated in February and emerged as adults in the latter

part of April and early May 1922. There appeared to be only one species—*Thereva plebeia*. The emerged male and female flies were placed in muslin cages fitted over 8-in. pots containing young cabbage plants, but no eggs were laid, so that all subsequent experiments had to be conducted with half-grown larvæ obtained from the field plots.

Two hosts were used in the pot experiments: (i) young spring cabbage plants, and (ii) sprouting potato tubers. The soil in which the plants were potted was obtained from the plots in which damage was observed in 1921.

Two sets of experiments were started in October 1922, one in which the host plants were potted into untreated soil, and the other in which the same soil was used but with the addition of considerable quantities of humus, e.g. leaf mould, decaying turf, and dead weeds.

Experiment 1.—On October 2, 1922, twelve young cabbage plants were potted into 8-in. pots—six (A–F) containing garden soil with a low humus content (see Analysis), and six (H–M) containing the same soil with the addition of considerable quantities of well-decayed leaf mould, rotting turf, and dead weeds (*Chickweed*, *Stellaria media*, and *Whitlow Grass*, *Erophila verna*). Several larvæ were dug up from the cabbage plots and introduced into the pots—six larvæ to each pot.

On October 11, two of the cabbage plants (C, D) showed signs of wilting, and, on examination, three larvæ were found penetrating the tissues of the underground portion of the stem, bringing about damage resembling that done by the cabbage-fly larvæ. These two plants died on October 20. The remaining plants (A, B, E, F) were similarly attacked, but less severely, so that they eventually grew away, as sometimes happens to Brassicas attacked by *Chortophila brassicae* and onions attacked by the onion-fly (*Phorbia cepetorum* Meade). In the control pots (H–M) no sign of damage was noticed, and the larvæ were found amongst the leaf mould and decaying turf.

The larvæ fed intermittently throughout October, November, and the early part of December, when they became sluggish in their movements and eventually pupated in February 1923.

The adult flies emerged from April 20 to May 5.

It was suggested that the water content of the soil would show a marked interference with the life histories of this fly, especially in the larval and pupal stages. A series of experiments showed that a high mortality occurred in pots which were heavily watered and in the pots which were kept very dry, but in those pots in which the water content of the soil was kept fairly constant all the larvæ pupated and emerged as adult flies. It was also observed that the larvæ pupated at a greater depth (2–3 in.) when the soil was dry, whereas in those pots which were heavily watered the larvæ pupated at an average depth of $\frac{1}{2}$ – $\frac{3}{4}$ in., and, in one instance, on the surface of the soil.

This shallow pupation in the case of a saturated soil is readily observed in many pests, and can be easily understood in the case

of *Thereva* species, whose pupa is naked and devoid of any puparium or earthen cell.

Experiment 2.—On October 15, 1922, a glass-sided observation box (20 in. long × 14 in. high × an average width of 3½ in.) was constructed, and six potato tubers were placed therein in the poor soil from the plots, together with nine half-grown larvæ.

In ten days five of the larvæ had penetrated into two tubers, and their position resembled an attack by wireworm (*Agriotes* species). These tubers were invaded by bacteria and soil fungi and rotted. One other tuber failed to sprout, but the other three sprouted and eventually grew on.

Similarly, tubers were potted singly in 8-in. pots. Four pots (1-4) contained soil from the plots and four (5-8) contained the same soil with the addition of humus-forming agents, as in the first experiment. As very few larvæ could be obtained at this period, only four larvæ were placed in each pot, with the result that three of the tubers growing in the unmanured soil rotted through *Thereva* attack. In the case of the tubers growing in soil rich in humus, none was attacked, with the exception of the potato in pot 7, where one larva commenced to penetrate, but soon desisted and fed eventually on the leaf mould.

All the larvæ pupated and emerged as adults from April 22 to May 10, 1923.

GENERAL REMARKS.

The only species bred from all these experiments was *Thereva plebeia* L., although other species of *Thereva* occur at Wisley, and eight British species are known.

All the larvæ collected proved to belong to one species, so that the larval and pupal descriptions must necessarily be confined to *T. plebeia*.

The pots and field experiments clearly showed that the larvæ of this species will attack plants which are growing in soil that is poor in humus-forming materials, but when a soil contains an average amount of decaying organic matter in the form of leaves, plants, roots, and weeds, then preference is shown for dead rather than living matter.

It has occasionally been suggested that these larvæ are never numerous enough to be of economic importance, but it is interesting to note that as many as eleven larvæ were found in two square feet during a bad attack in 1921. The degree of attack varied in different parts of the plots, and the larvæ were not evenly distributed over the plots, as in the case of the surface caterpillars. There appears little to fear from this pest becoming really troublesome, in properly cultivated and manured land, but danger exists in the case of plants either growing in newly broken-up land or potted into soil obtained from pastures, when *Thereva* larvæ may be unwittingly introduced into the compost.

DESCRIPTIONS OF LARVAL, PUPAL, AND ADULT STAGES.

Fully grown larva (fig. 36A).—The larva is cream-coloured, worm-shaped, 30 mm. long by 2 mm. wide at the 4th–15th segments.

There are two distinct sections—(i) the head and (ii) the body.

(i) The head is small, hook-like, non-retractile, eyeless, and bears eight scattered setæ. The posterior internal chitinized extension is rod-like and spatulate at apex (fig. 36B).

The paired organs are (i) the antennæ, which are two-jointed and of moderate length, and (ii) the mandibles, which are strong, prominent, dark brown, with their apices pointed and bent outwards.

It was observed that the larva occasionally uses its hooked head in order to progress in the soil.

(ii) The body is cylindrical and consists of apparently nineteen segments, but, according to Malloch, the first six abdominal segments are subdivided by means of distinct circular constrictions.

The first three (thoracic) segments each bear two setæ placed lateroventrally.

There are two pairs of spiracles, placed (i) anteriorly on the first (pro-thoracic) segment, and (ii) posteriorly on the seventeenth segment, which is really the eighth abdominal. The anterior spiracles are more distinct than the posterior pair.

The anal segment is much constricted and bears a pair of tubular processes and scattered setæ.

Pupa (fig. 36C).—The pupa is free, nearly cylindrical, 11 mm. long and 2·5 mm. broad across the thorax and 1·8 mm. broad across the abdominal segments. The head, thoracic, and abdominal divisions are distinct and armed with spinous processes, and the abdomen is clothed with numerous bristles. The head bears two lateral thorn-like structures or antennal sheaths. The thorax bears a long curved thorn at the base of each wing, and the apices of the hind tarsi extend beyond the apices of the wings. The abdomen has eight visible segments, each furnished with a single transverse girdle of spines, and a row of spines surrounds each spiracle.

There are eight pairs of spiracles, one pro-thoracic and seven abdominal, projecting from the lateral margin.

The posterior segment ends in two long slender thorns, which are separated towards their apices.

Adult (fig. 37).—The following description is by WALKER *; a few additional notes have been added in square brackets.

Black, thickly clothed with tawny hairs [9 mm. long with a wing expanse of 15 mm.].

The head is clothed beneath with yellow hairs, and on the crown and each side of the epistoma with black hairs. The proboscis is ferruginous [feeble, fleshy, and never elongated]. Antennæ [prominent, 3-jointed, tapering, as long as the head], the first and second joints clothed with tawny hairs beset with black bristles, and

* F. WALKER, *Insecta Britannica Diptera*, vol. i., 1851, p. 76.

the third joint ferruginous at base. [Eyes of male contiguous. Vertex on a level with the eyes. Ocelli three.] The thorax [is provided with distinct black bristles arranged in rows]. Wings (fig. 36D) very pale grey [slightly smoky], tawny at the base and along the fore margin. Halteres tawny with ferruginous knobs and a black ring at the base. Legs tawny, beset with black bristles [forming rows of spicules], femora black, clothed with pale tawny hairs; tibiæ ferruginous; tips of tarsi black [5-jointed, with groups of black bristles at apex of each joint, minute claws and pulvilli, but no empodium].

The abdomen has the hind borders of its segments gilded [elongate, tapering, with the appearance of being clothed with woolly hairs].

I am indebted to Mr. F. W. EDWARDS, M.A. (British Museum), for identifying the species, and also for advice upon the necessarily shortened descriptions of the larval, pupal, and adult stages; and to Dr. F. V. DARBISHIRE of Wisley for the soil analysis.

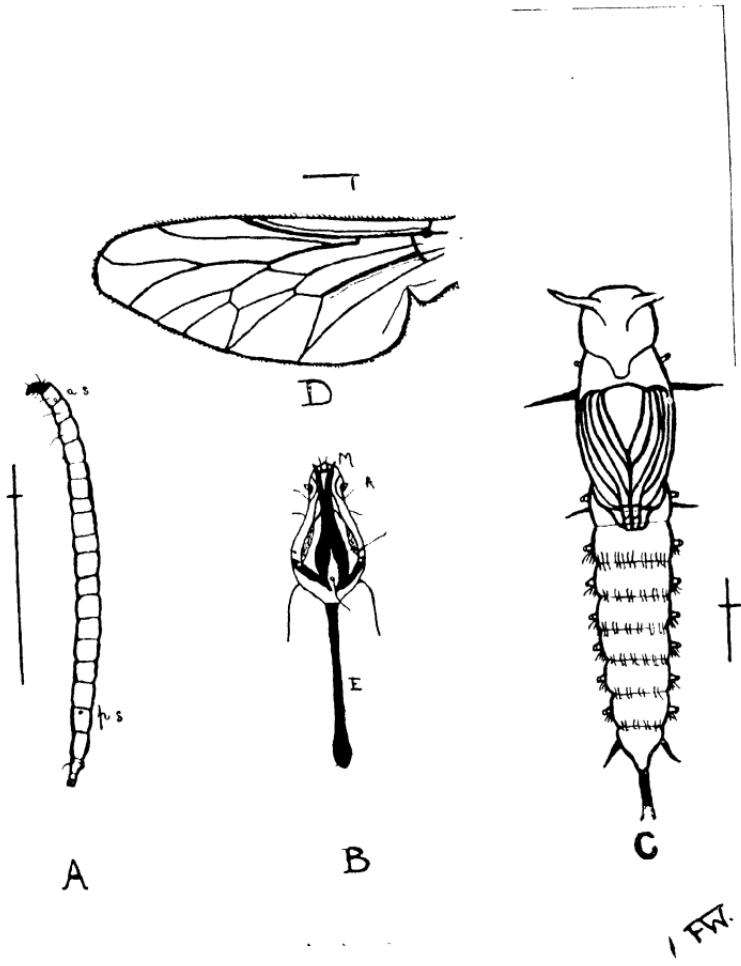


FIG. 36.—*THEREVA PLEBEJA*.

A, Larva (*a.s.*, *p.s.*, spiracles); B, portion of head (*M*, mandibles, *A*, antennae, *E*, backward extension of head); C, pupa; D, wing.

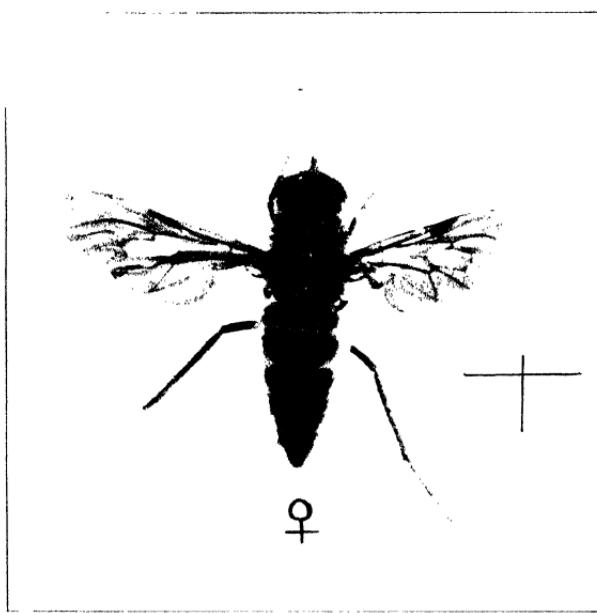


FIG. 37. *Therixa peregrina* (FEMALE).



FIG. 38.—EELWORM DISEASE OF PHLOX.

For description see text

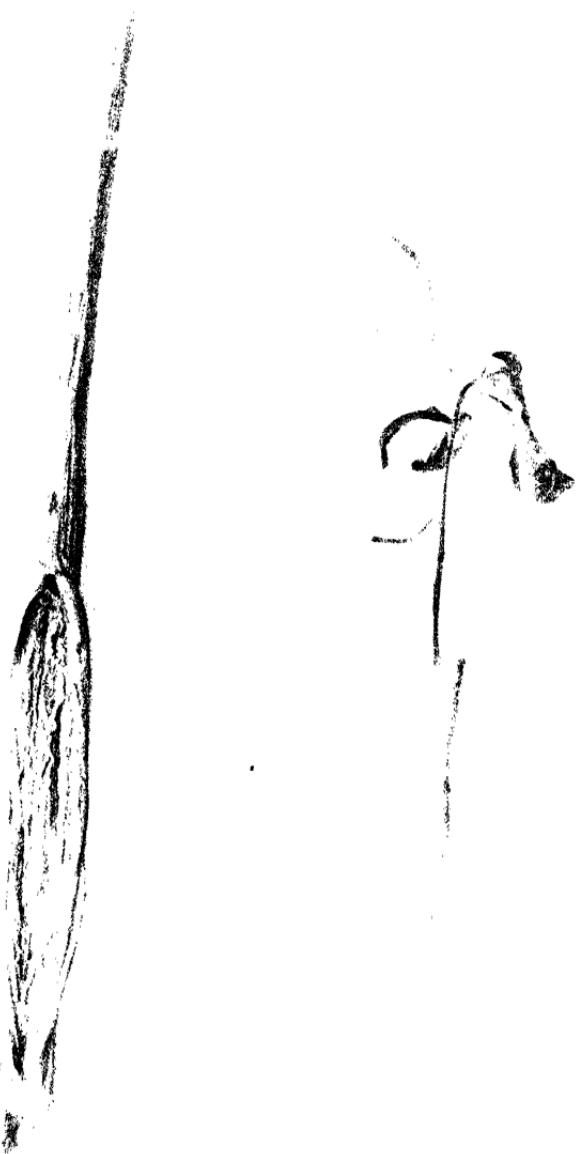


FIG. 30.—FELT WORM DISEASE OF PHLOX.
A, cracked stem; B, a root cutting.

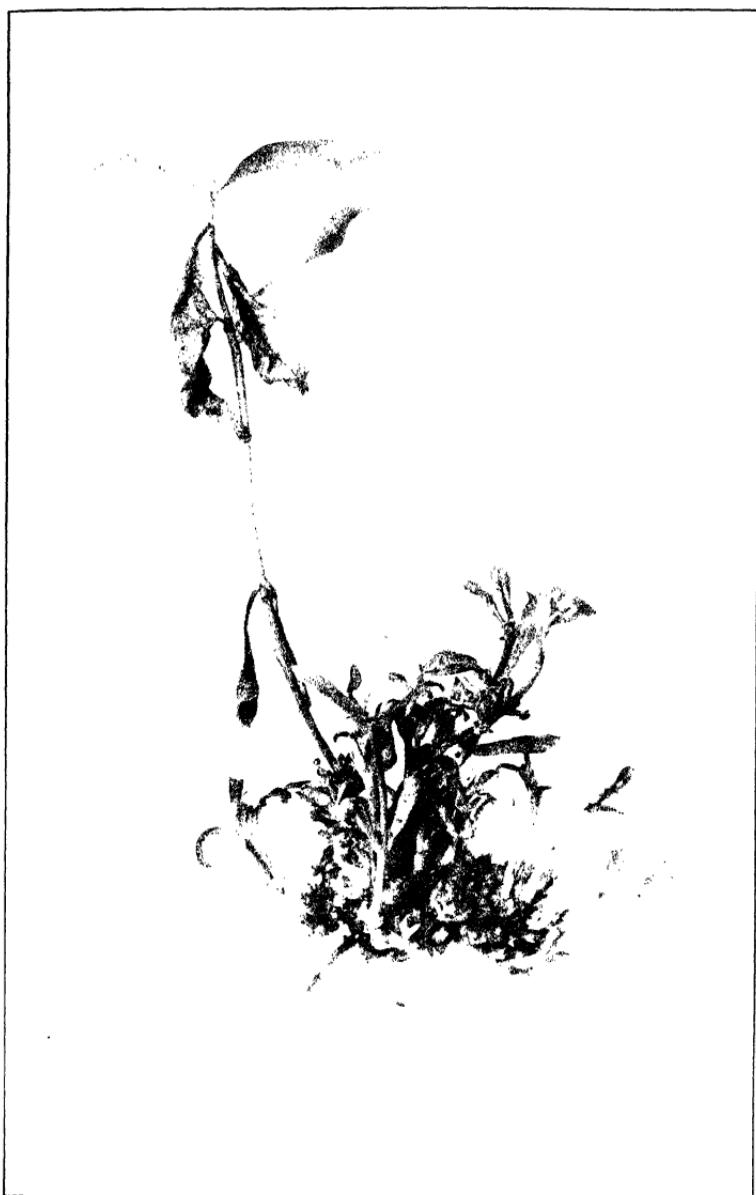


FIG. 40. ROOTWORM DISEASE OF PHLOX
Proliferation of basal buds.

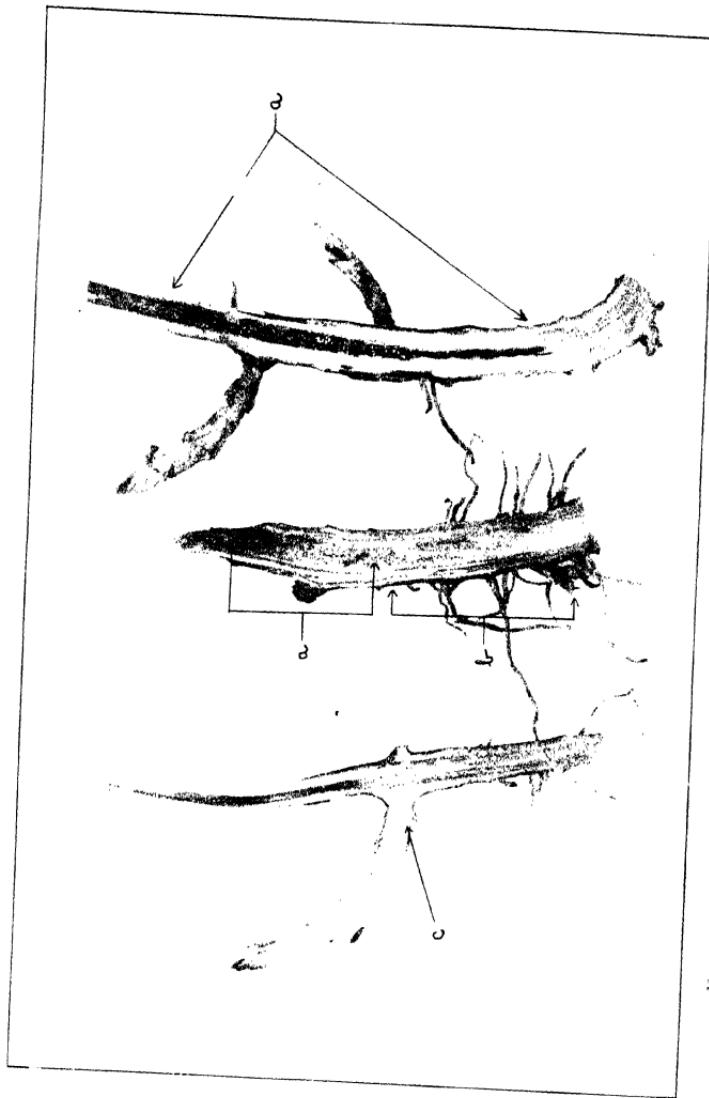


FIG. 41.—SECTIONS OF STEMS OF PLANTS ATTACKED BY CATERPILLAR (*Typhoniella destruens*).



FIG. 42.—EELWORMS (*Tylenchus devastatrix*)
concerned in Phlox disease.



FIG. 43.—HEALTHY LEFT AND DISEASED RIGHT PLANTS OF *PATRIS DRUONOIDES*.
The latter attacked after watering with water containing the *Phlox* cystworm.

1 *Trans.* p. 203.

CONTRIBUTIONS FROM THE WISLEY LABORATORY.

XLIII.—THE EELWORM DISEASE OF PHLOXES.

By G. FOX WILSON, N.D.H., F.E.S., Entomologist.

THE disease of herbaceous perennial Phloxes here dealt with has been known for many years; but while it was generally recognized that it was due to the attack of a form of the stem eelworm, *Tylenchus devastatrix* Kühn, little was known about the methods of infection, the cause of its somewhat irregular appearance, relative susceptibility of varieties to the disease or danger of infection. Investigations were therefore commenced in 1921 and carried on during the past three years, the results being set out below.

This disease is the only one of importance attacking the herbaceous perennial Phloxes, but varieties of both *Phlox decussata* and *P. suffruticosa* are liable to it, and in some seasons and places the attack may be so bad that the plants are almost killed out and attempts to cultivate them result in nothing but disappointment.

The trouble has been known for many years in European countries, and was first described by PAUL NYPELS* in 1898. Further accounts were published by Bos,† OSTERWALDER ‡ in Germany, and DEN BROCK and SCHENK.§ WEISS || described it for the first time in America, and suggested that it was introduced from Holland.

Symptoms of the disease.

The symptoms of the disease vary according to the season and severity of the attack. The principal symptoms (some of which may be mistaken for injury resulting from drought) are:

1. The leaves are very narrow, crinkled and waved at the edge (fig. 38A).
2. The stems are elongated and soft (fig. 38A) or stunted and swollen (fig. 38B).
3. The epidermis of the leaf separates from the underlying tissues and an inflated appearance results (fig. 38).
4. The stem cracks (fig. 39A).
5. Proliferation of the basal buds occurs (fig. 40).

All forms of malformation may be seen in the same plant, but the most marked are those numbered 1, 2 and 4 above.

* NYPELS, *Annales de la Soc. Belge de Micro.* xxiii. (1898), pp. 26-29.

† BOS, *Zeitschr. f. Pflanzenkr.* v. (1899) and xiv. (1904).

‡ OSTERWALDER, *Zeitschr. f. Pflanzenkr.* xii. (1902), pp. 340-342.

§ DEN BROCK and SCHENK, *Zicht. en Beschadigingen d. Tuinbouwgewassen*, i. (1915), pp. 238-299.

|| WEISS, *U.S.A. Exp. Sta., New Jersey, Circ.* 64, June, 1923.

The abnormal development of the foliage takes many forms, the commonest being the crinkled or rolled condition, which is due to the presence of eelworms in the vascular tissue of the stem and petioles. The cracking of the stem alone is not to be regarded as symptomatic of the eelworm attack, for drought may bring it about, but when the cracking is due to eelworms the cracks are particularly deep, and may even extend down to the pith.

Professor RITZEMA BOS, speaking of this phenomenon in "Agricultural Zoology," says, "Since only those parts of an organ which are inhabited by a large number of eelworms swell much, it is obvious that cracks often develop in the stems and the leaves concerned." The last symptom is rarely noticed, since the buds which are involved are either below or just at the surface of the soil.

Examination of the malformed tissues shows that they are inhabited by large numbers of *Tylenchus devastatrix*. The cells of the soft tissues of the stem are considerably enlarged and after a time usually separate from one another, and the cracking of the stems already alluded to is probably due to unequal growth.

The diseased stems at best produce flowers which are a mere caricature of what they should be, and in many cases they fail to flower at all.

Tylenchus devastatrix Kühn, and its Life History.

The egg, larval and adult stages of *Tylenchus devastatrix* have been fully described by Professor Bos,* and his minute descriptions need not be repeated here. To those familiar with their appearance the almost colourless eelworms, which are $\frac{1}{50}$ th to $\frac{1}{25}$ th of an inch long and very thin, are just visible to the naked eye when the stems of badly diseased plants are cut open or the tissues teased out on a microscope slide. Under the microscope they are seen to be sharply pointed at the tail and bluntly at the head. The mouth is terminal, and just within it is a spine or stylet which enables the eelworm to penetrate into the living tissues of the plant. The male eelworm is slightly shorter and narrower than the female, and has a bursa and two spicules at the posterior end of the body.

Other species of eelworms, white worms (*Enchytridae*), mites (*Tyroglyphus longior* var.) and tardigrades are frequently found in the decayed tissues during the winter months, but these feed upon the dead parts of the plants and are normal inhabitants of the soil and harmless to plants. *Tylenchus devastatrix* is the only species concerned with the attack.

During late autumn the eelworms pass in considerable numbers from the diseased stems of the plants into the surrounding soil, and make their way over the surface of the soil particles and between them until they reach a fresh host. Some will enter the basal buds of the same or possibly fresh plants; others hibernate among the pith cells

* DR. J. RITZEMA BOS, "L'Anguille de la Tige (*Tylenchus devastatrix* Kühn)," *Archiv. Musée Teyler*, iii. Ser. II. (1892), pp. 257-332.

of the old stems (fig. 41) and pass thence to young growths in spring. Observations show that during November the greatest number of eelworms were in the soil. Examinations of basal buds of the variety 'Rijnstroom' in December showed several adult eelworms in the cortex just beneath the epidermis.

As soon as growth commences the eelworms make their way up the growing shoots either in the vascular tissues or in the cortical cells just beneath the epidermis (fig. 42). If the invasion is by few the plant shows little outward sign of the attack, but if many have made their way into it some or all of the symptoms described above will be evident.

Egg-laying commences soon after spring growth starts, and eggs continue to be produced throughout spring and summer.

Towards the end of July the eelworms reach their greatest numbers, and in June and July all stages will be found in the tissues. By the middle of August the pith cells will be found full of adults and larvæ making their way down to the soil and underground stems. The eelworms are sometimes found also in the leaves, and especially in the vascular tissues of the petioles.

When in bad cases the stems crack, many of the eelworms may be found protruding from the cracks.

As the stems die down the eelworms descend and make their way into the soil or underground stems. They are never found in the roots.

The presence in winter in the dead stems of *Enchytracid* worms (white or aster worms, much larger than eelworms and closely allied to the earthworms) has been mentioned. JEGEN* found that these worms fed on *Tylenchus devastatrix* and *Aphelenchus ormeroides* in strawberries, and believed them to be capable of preventing the ravages of these pests if favourable conditions existed, but we have, unfortunately, been unable to confirm these observations on Phlox.

The first damage is done by the hibernating eelworms in the underground stems. These make their way into the basal buds, and the amount of proliferation (fig. 40) there caused is often so great that upward growth is entirely prevented. If infection is delayed until full growth has been made, abnormal leaves and spindly stems are of course not to be seen, but stem-splitting usually follows.

How long eelworms can maintain themselves in the soil outside their special food plant is not certain, but it is well known that they are able to survive long periods of drying. It is suggested that the water content of the soil has a great effect on the length of time that eelworms can survive without food, and that a dry soil is more favourable than a wet one. Numbers of *Tylenchus devastatrix* obtained from the powdery pith cells of Phlox in December 1922, and kept in a dry flask with the pith cells, became active on moistening in October 1923, and GOODEY † kept this species alive for two years by storing it in a dry condition in the laboratory.

* G. JEGEN, *Vierteljahrsschr. naturf. Ges.*, Zürich, lxv. (1920), p. 100.

† GOODEY, *Jour. Helminth.*, i. pp. 50-52 (May 1923).

Severity of Damage dependent upon Conditions.

The worst attack during recent years at Wisley occurred in 1923, when cold and wet weather was experienced in early May, at a time when the young Phlox shoots were a few inches above soil level, which naturally gave a severe check to the plants. The result of such a check during the critical period of early growth is that the eelworms increase and the plants are unable to grow away from the trouble.

Badly attacked plants, which had been lifted and grown in pots under glass, did not show the damage to such an extent as those plants which were growing out of doors.

Plants of the variety 'Rijnstroom' were grown under glass, and although eelworms were found in the tissues, they were not in sufficient numbers to cause the general symptoms or materially to alter the growth. It is such plants as these which are often sent out from nurseries and gardens in what is considered a healthy state, free from eelworm infection.

Other plants, in which numerous eelworms were found, grew away from the pest when brought into congenial surroundings, and the only sign by which one could know that an early attack had been experienced was that the lower part of the stem showed signs of the crippling, while the later growths were healthy.

Susceptibility of Different Varieties of Phlox to Attack.

So far as is known, no variety of herbaceous perennial Phlox entirely resists attack by this eelworm, but not all appear to suffer alike. The very large collection of Phloxes at Wisley afforded ample opportunity to compare the behaviour of varieties in this respect during the last two years.

In 1923 the observations were made on plants growing in damp, rather sour soil (weeds were sheep sorrel (*Rumex Acetosella*) and Mare's-tail (*Equisetum arvense*)), and an attempt was made to group those of which the greatest numbers of plants were available for comparison into five groups, which are given below :

1.	Very susceptible vars.	16	' George A. Ströhlein ' (orange-scarlet). ' Le Mahdi ' (violet). ' Rijnstroom ' (rose).
2.	Susceptible vars.	122	' Baron von Dedem ' (orange-scarlet). ' Frau Antonin Buchner ' (white). ' Gen. van Heutsz ' (salmon-scarlet).
3.	Fairly resistant vars.	125	' Elizabeth Campbell ' (salmon-pink). ' Maspero ' (rose-white). ' Rosamundi ' (pink).
4.	Resistant vars.	50	' Esclairmonde ' (mauve). ' Aegir ' (scarlet). ' Boule de Feu ' (scarlet). ' Netty Stuart ' (white).
5.	Very resistant vars.	28	' Antonin Mercié ' (mauve). ' Widar ' (violet).

All the above varieties, with the exception of 'Netty Stuart' (*Phlox suffruticosa*), belong to the species *P. decussata*.

Mr. J. C. F. FRYER, M.A., Entomologist to the Ministry of Agriculture, has kindly sent me a list of varieties growing in his garden at Chatteris, Cambs., in a fine silt soil, arranged according to the amount of damage done by this eelworm, and from this it appears that, with one exception, the behaviour in the two gardens closely corresponds. The exception is the variety 'Frau Antonin Buchner,' which at Chatteris remained normal in appearance, but at Wisley in both years became badly damaged by the attack.

The white varieties were perhaps, on the whole, the least liable to injury, but, apart from the colour groups, 'Antonin Mercié' and 'Widar' were almost undamaged. Artificial infection of these varieties was, however, secured, but they proved able to grow away from the pest, and the only visible damage was the cracking of the stem near the point of inoculation. NYPELS * found that the variety 'Vierge Marie' was highly resistant.

Infection Experiments.

Considerable numbers of infection experiments have been carried out with this eelworm, the methods being :

- (1) Direct inoculation of growing plants made by a sterilized needle.
- (2) The potting of plants and sowing of seed in soil infested with the eelworm.
- (3) Watering potted plants and seed pots with water containing eelworms derived from diseased Phloxes.

In carrying out the methods (1) and (3) all soil was previously sterilized at 98° C. (208° F.) for three hours; in method (2) control plants were grown in sterilized soil.

It has so far been found difficult to isolate a pure culture of *Tylenchus devastatrix* derived from Phlox plants on account of the difficulty of excluding foreign organisms.

These infection experiments have been carried out with onions, narcissi, *Phlox Drummondii*, *Campanula persicifolia*, *Schizanthus*, larkspurs, and sweet-williams.

Attempts to infect other plants known to be subject to attacks by the stem eelworm have succeeded only with Sweet-William (*Dianthus barbatus*) and *Phlox Drummondii* (fig. 43) when they were watered with eelworm-infected water.

It has been definitely proved that this species of eelworm can penetrate healthy living tissue of herbaceous Phloxes, for a series of infection experiments was commenced in June 1922, when adult eelworms were placed in the leaf axils of healthy plants, with the result that penetration was effected in every case, although the tissues were not injured in any way previous to infection.

* NYPELS, *loc. cit. ante.*

Susceptibility of other Plants to attack by the Phlox Eelworm.

A very large number of plants are known to be attacked by *Tylenchus devastatrix* Kühn. Onions,* narcissi,† potatos,‡ larkspurs,§ chives, carnations, *Scillas*, *Campanula persicifolia*, sweet-williams, *Phlox Drummondii*, beans, peas, oats, wheat, among other plants, are liable to attack. Prof. Bos || gives a list of sixty-eight host plants for this species. The eelworms from these plants are indistinguishable from one another under the microscope, but are not all alike in their habits, for in many instances eelworms from one particular plant cannot (or do not) attack other kinds of plants. DEN BROCK and SCHENK record that the stem eelworm of *Phlox* attacks *Primula chinensis* (*sic*), peas, and potatos, but they do not describe infection experiments.

The eelworms from the narcissi readily attack onions, and vice versa, but, so far as is known, no other plant (RAMSBOTTOM).¶

The parasitism of the *Phlox* strain of eelworm seems equally restricted. This dependency on certain host plants is known as specialized parasitism, and it was recorded by Prof. Bos many years ago when he put forward his theory of biological strains.

The Spread of Infection.

There are two principal ways by which the eelworm spreads from place to place, viz. by

- (a) actual migration in the soil, and
- (b) carriage in plants, soil, manure, or by wind and water.

(1) Experiments conducted with badly attacked plants growing in very damp soil and in light, well drained soil respectively showed that the rate of spread from a common centre in the first named is very rapid on account of the ease with which the eelworms can progress in a watery medium between the soil particles. In light, sandy soil, progress is much more difficult, and the subsequent spread from an infected centre to neighbouring healthy plants is comparatively slow.

(2) The means by which eelworms are carried from place to place are :

(a) Infected soil adhering to garden tools is a common source of infection. In digging up some *Phlox* plants at Wisley in December 1922,

* Miss A. E. ORMEROD, 20th Ann. Rept. of Observations of Injurious Insects (1897), pp. 107-115.

† J. K. RAMSBOTTOM, Journal R.H.S., vol. xlivi. Pt. 1 (May 1918), pp. 51-78.

‡ T. GOODEY, "Potato Eelworm," Jour. Agric. Science, vol. xii. Pt. 1 (Jan. 1922), pp. 20-30, and Jour. Helminth. I. pp. 197-204.

§ Prof. F. V. THORBOLD, Jour. S.E. Agric. College, Wye, Kent, No. 22 (1913), pp. 289-290.

|| "Tydschr. Plantenziekten, Wageningen," vol. xxiii. No. 3 (June 1917), pp. 99-135.

¶ Journal R.H.S., vol. xliv. (May 1919), pp. 68-72.

a large amount of soil stuck to the trowel. When this soil was tested by the centrifugal method numerous male and female *Tylenchus destratix* were found to be present.

(b) Similarly, soil picked up on the boots of persons walking over infected soil will carry the pest.

(c) Heavy rains and floods wash many of the eelworms out of the soil and deposit them in hitherto uninfested ground.

(d) High winds carry the dried-up, but still living, eelworms.

(e) In dead flowering stems of Phloxes put upon rubbish heaps, where the eelworms survive for long periods, and are often carried back to the land in manure.

(f) The introduction of infected stock from nurseries and gardens. Many infested plants are unwittingly introduced into gardens, for the reason that plants, in the first stages of infestation, do not always show the typical symptoms, and thus the trouble passes unnoticed for a year or so.

(g) The vegetative propagation of plants from stem cuttings and division.

Avoidance of the Disease.

In order to avoid the disease two things are necessary—viz., clean eelworm-free soil and clean healthy plants.

Prof. Bos seems to have thought at one time that all soils contain the different strains of *Tylenchus destratix* and *Heterodera radicicola*, but he now considers,* as a result of growing the same plant in the same soil for many years and finding it remain free from attack, that they are not always present. This is our experience.

No practicable means of ridding soil of eelworms in the open ground is yet known, but healthy plants are easily infected from soil containing the Phlox eelworm. Neither Phlox, nor any other susceptible plant (like the Sweet-William), should therefore be planted in soil known to contain the eelworms for a period of seven years after an outbreak has occurred. Great care should also be taken that soil is not transported from the infected part of a garden to fresh areas and the infection so spread.

Soil in which Phlox is to be propagated should be heated for three hours to at least 180° F. (82° C.). This will kill all eelworms, and is the most effective method of doing so.

Phlox may be propagated by seed, but it is not yet known whether the eelworm is ever carried in the seed.

When multiplication of named varieties is desired recourse must be had to division or cuttings. Division of diseased plants is sure to result in diseased progeny.

Propagation by stem cuttings from diseased plants, even though the cuttings themselves appear healthy, often results in failure to

* "Tydschr. Plantenziekten, Wageningen," vol. xxvii. No. 3 (March 1921), pp. 29-44.

raise clean stock (figs. 44, 45). Stem cuttings from healthy plants placed in soil free from the eelworms should, of course, be safe.

Root cuttings (fig. 45) do not carry eelworms so long as the roots are washed completely free from the soil surrounding them, and clean stocks may be raised from infected plants by the use of soil-free root cuttings put into clean soil. All parts of diseased plants should be burnt, not placed on the rubbish heap.

The treatment of plants during the dormant season by hot water is still in the experimental stage, so that full results cannot yet be published. When the dead flowering stems are cut down in the autumn an effort should be made to cut them as low down as possible in order to prevent the eelworms hibernating in the dead pith cells, although many eelworms will be found in the underground stems.

My acknowledgments are due to the Director of Wisley for suggesting the research and for help during investigations, to Mr. J. C. F. FRYER and Prof. RITZEMA BOS for notes on this pest ; to Mr. S. HIRST (British Museum) for naming the mites found in the pith cells ; and to Mr. N. K. GOULD for all the photographs.

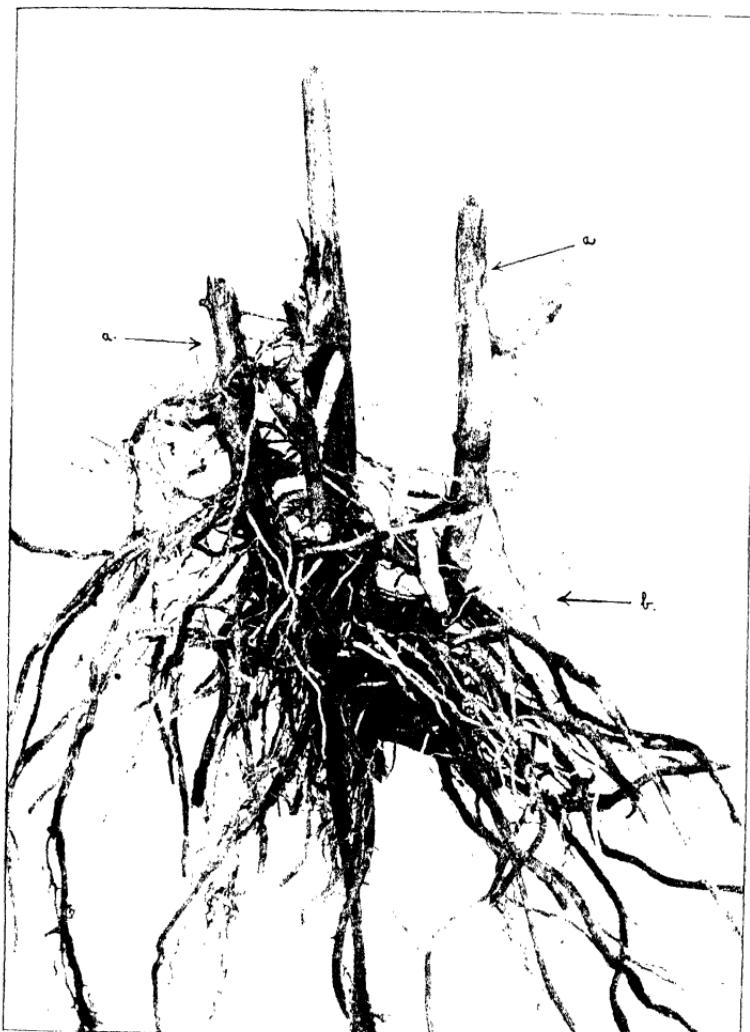


FIG. 44.—THE BASE OF A PHLOX PLANT, SHOWING OLD STEM (a) AND YOUNG GROWTHS IN FIRST STAGES OF INFECTION (b).

[To face p. 210.]



FIG. 45. A. HEALTHY PLANT RAISED FROM ROOT CUTTING. B. DISEASED PLANT RAISED FROM STEM CUTTING.

Both cuttings taken from diseased plants.



FIG. 46.—ON LEFT, MULAWETI LEAVES; ON RIGHT, HIMALAYA LEAVES.



FIG. 47.—LEAFLET ARTIFICIALLY INFECTED WITH CLADOSPORIUM ALBUM (see p. 212).

[To face p. 211.]

CONTRIBUTIONS FROM THE WISLEY LABORATORY.

XLIV.—A NEW DISEASE OF SWEET PEAS.

By W. J. DOWSON, M.A., Mycologist.

Description and Occurrence.

IN July 1922 a number of sweet pea leaves was received at Wisley for examination of what the sender described as a "mildew-like" appearance. The plants from which the leaves had been taken were grown under glass, but the sender subsequently intimated that sweet peas grown outside and near the glasshouse had become similarly attacked. Many of the leaves were almost covered on both sides with a white mealy powder, while others bore only a few spots the size of a sixpence or less, the edges of which were not very definitely marked. The wings of the stems also bore a few elongated spots, on which the same white mealy powder was to be seen.

Looking carefully at the larger spots through a lens, the actual surface of the leaf was seen to be sunken and of a faint buff colour: the epidermis of the smaller spots was also sunken, but dead white in colour, and that on the wings exhibited a light reddish-brown tinge suggestive of the "streak" disease.

Fig. 46 is a photographic reproduction of a pair of the leaflets actually received, and alongside them is a pair of healthy leaflets for comparison. It will be seen from the illustration that the spots have very indefinite margins which tend to fade away—an important point for the diagnosis of the fungus concerned, which will be referred to later. A piece of the affected part of the leaves seen under the low power of the microscope showed tufts of conidiophores surmounted by numerous branched chains of nearly rounded spores, generally emerging from the stomata, but also springing from between adjacent epidermal cells.

A microscopic examination of the spores at once showed that they were neither those of *Erysiphe polygoni* nor of *Peronospora viciae*, but resembled in all but colour, which was perfectly white, the conidia of the mould *Hormodendron cladosporioides*. *Erysiphe polygoni* D.C. is the very common powdery or true mildew of garden, field and sweet peas; *Peronospora viciae* De Bary is sometimes found on field peas, though more often on garden peas, but has not yet been recorded on sweet peas; *Hormodendron cladosporioides* (Fres.) Sacc. is known as a saprophytic olive-green mould which JANCZEWSKI * showed to be but another form of the very common mould fungus *Cladosporium herbarum* Link. The relation between the two forms has been

* JANCZEWSKI, "Polymorphisme du *Cladosporium herbarum*," *Bull. Acad. Sci. de Cracovie*, 30, 1892. "Recherches sur *Cladosporium herbarum*," *ibid.*, 1894.

confirmed recently by BROOKS.* The name and systematic position of the sweet pea fungus is considered later.

In June 1923 sweet pea leaves similarly affected were received from the same source as in 1922; in August plants bearing similar though smaller spots were sent to Wisley from the Isle of Man; these plants had been grown in the open. Lastly, towards the end of August, on a trial of sweet peas in the open at Wisley, a similar white mould was discovered on the older leaves and stems. The spots on the last-named were distinctly pale buff in colour when seen at a short distance. The buff colour was found to be due to the killed leaf tissue and not to the fungus, all parts of which were quite colourless.

Infection Experiments.

To ascertain as quickly as possible whether or not this white mould was parasitic on sweet pea leaves or only saprophytic and following on some other injury, a number of sweet pea seedlings was raised and inoculated with the spores of the fungus in September 1922. The spores used in these infection experiments were obtained from two sources: (1) from pure cultures in hanging drops and on nutrient agar slopes (see p. 214), and (2) from the original leaves. The pure cultures gave a relatively small number of spores, because of the very restricted growth of the fungus on artificial media; while the diseased leaves provided a plentiful supply of conidia, which were transferred to the seedling sweet peas in various ways. The leaves of one lot of seedlings were rubbed gently with diseased leaves bearing abundant conidia; the leaves of another lot were dusted with spores by holding a handful of diseased leaves above the pot and shaking and tapping them: a third lot of seedlings was sprayed with a suspension of spores in water by means of a small atomizer. The pots were sunk in sand kept fairly moist and covered with bell-jars for six days. The bell-jars were then removed, and, on the tenth day after inoculation, numerous very minute (pin point), white to pale buff-coloured spots appeared on the leaves. Two days later the spots had increased slightly in size and in number, and bore a remarkable resemblance to the lesions caused by thrips. At first, indeed, thrips were suspected of being present, but a careful examination revealed none, and the very large number of developing spots precluded them as possible agents of infection. The spots increased in size, and were at first rather angular in outline, being limited by the smaller veins of the leaf. By coalescence a large blotch was formed, the margins of which were faint and not very distinct (fig. 47). At this stage the colour of the spots was a pale buff or almost dead white. A week to ten days after the first signs of spotting, spores were produced in little clusters on both sides of the enlarged spots. These continued to increase in number to such an extent that three weeks from the time of inocula-

* BROOKS, "Mould Growths upon Cold store Meat," *Brit. Myc. Soc. Trans.*, vol. 8, 1923.

tion large blotches were produced completely covered with white spores, presenting the mealy appearance first noticed (fig. 48).

Leaves with large blotches covering the surface fell prematurely, and some of the seedlings were completely defoliated and died within six weeks from the time of inoculation. Further batches of sweet peas were raised and inoculated in the same way when about 8 inches high. This procedure was repeated several times, and the fungus was kept growing on plants through the remainder of 1922 and the whole of 1923. During the late spring and summer of 1923 it was found that the bell-jars could be dispensed with, and that, by keeping the plants in a house where the temperature was then high and the atmosphere laden with moisture, the disease could be produced at any time by spraying or dusting on spores.

Large plants 2 to 3 feet high were inoculated in this way in May 1923, and exhibited at the Chelsea Flower Show at the end of that month. These older plants had assumed by that time the larger leaves typical of mature plants, and it was these which had been successfully infected, thus presenting a very faithful reproduction of the disease.

In the autumn and winter of 1923 and the early spring of 1924 a further series of inoculations was performed, using as the infecting material spores produced on plants grown in the open. As mentioned above, similar spots were observed in August and September in 1923 on the trial of sweet peas at Wisley, and it was from this source that cultures of the fungus were obtained for these infection experiments. The results were precisely similar and need not be detailed here. While they were in progress, however, steps were taken to find out if infection could be prevented by the use of some fungicide.

For this purpose a pot of fairly large plants (2-3 feet high) was kept in the house for some days, and then flowers of sulphur were applied through a bellows so as to cover the foliage as completely as possible with sulphur in a fine state of division. The plants were next sprayed with a suspension of spores, but no spots ever developed. Repetitions of this experiment during the autumn of 1923 never resulted in infection.

From the foregoing observations and experiments regarding this disease certain conclusions were drawn, which may be summarized here before passing on to the account of the detailed study of the fungus in the laboratory.

Conclusions drawn from above.

The fungus which has thus been proved responsible for the severe spotting of sweet pea leaves grown under glass is evidently fairly widely distributed in Nature, as it has been found on plants grown out of doors at places so widely separated as Wisley and the Isle of Man. In neither of these two instances was it at all conspicuous : in fact, the specimens from the Isle of Man were sent to Wisley not

because of the blotching, but on account of thrips injury. Those at Wisley were found only after close inspection. Mildew (*Erysiphe polygoni*) was fairly abundant on these plants, and tended to obscure the pale-buff blotches due to the other fungus.

It seems that the fungus with which this paper is concerned is, in nature, a mild parasite ; that is, an organism which under ordinary climatic conditions just manages to exist on sweet pea leaves without doing any appreciable harm to its host. Conditions more favourable to the fungus enable it to become more virulent and its effects more obvious. Of these conditions a fairly high temperature appears to be the most important. Thus, at the time it was first recorded from a glasshouse in July 1922, the outside air temperature was decidedly above the normal, which would mean that the temperature within the house would be fairly high. In the following year, 1923, the summer months—July, August and September—were again warm and above the average. That year the disease once more appeared in virulent form in the same glasshouse, and during the latter two months was found outside, as previously recorded, in the Isle of Man and at Wisley. Doubtless it occurred elsewhere, but had not been observed.

As a means of controlling the disease, the experiments at Wisley indicate that protection can be obtained by the application of sulphur in a fine state of division. It is recommended that the sulphur be applied in early summer, in June say, and repeated at intervals of ten days, should an outbreak be feared. Sulphur applied *after* the appearance of the disease would almost certainly prevent its spread, but would not save the leaves already infected, because the parasite is not a true mildew, but invades the inner tissues of the leaves (see below).

No doubt the disease spread rapidly in the glasshouse through over-head watering, whereby the spores would be splashed about from leaf to leaf, and carried upwards by slight air currents. In the open, rain would splash the spores about, and air currents would also operate ; but the temperature being lower, the disease does not spread to anything like the same extent as it does under glass.

The Examination of the Fungus and its Effects on the Leaves in the Laboratory.

It was found quite easy to obtain pure cultures of the fungus on artificial media, either by pouring plates or by inoculating slants of nutrient agar direct from infected leaves bearing abundant spores. Potato broth agar, Dox's medium, and steamed potato plugs were employed in this work, and on all three the growth was slow and remained small. The growths obtained never exceeded $\frac{1}{2}$ inch in diameter when arising from single spores. Streaked on to agar slants a thin white fluffy line was all that ever resulted. The aerial mycelium, the spores and their spore-bearing hyphae were always colourless, and remained so, but in cultures many months old the hyphae

penetrating the substratum assumed a pale-brown tint. So restricted was the growth formed on artificial media that the greater number of the inoculations were made from spores produced on living leaves; though controls were constantly arranged whereby a few marked plants were inoculated with spores derived from the pure cultures on artificial media.

As soon as spores were produced in pure culture a closer study of the fungus was made by means of "hanging drops." Both Dox's medium and potato broth agar were employed in these, and the drops were inoculated with as few spores as possible.

The spores of the fungus (fig. 49) are mostly lemon or pip-shaped, and vary a great deal in size; some are almost round (fig. 49) and a few are elongated, cylindrical (fig. 49L) and one-septate. They are devoid of all colour. A characteristic feature of these spores is the presence of small projections at the poles; some have only one at each pole, others are provided with as many as three, while a few are joined together by two polar projections. They measure $2\cdot5\mu$ - $5\cdot5\mu$ wide by $3\cdot5\mu$ - $12\cdot5\mu$ long. The long cylindrical spores average 3μ wide by 15μ long. In fig. 50 spores stained in Haider-hain's iron alum haematoxylin are shown. In most of these an indefinite nuclear mass is seen, and in some, besides this, there are indications of other bodies which take up the nuclear stain.

In germination one to three germ tubes are produced, nearly always from the ends of the spores, and in a few days a small mycelium is formed consisting of hyphae measuring 2μ - 4μ in width, and septate at rather irregular intervals. Four to five days after germination conidiophores (spore-bearing hyphae) are formed and can be recognized as such as they stand up from the substratum into the air.

A single elongated conidium (spore) is produced at the end of the conidiophores. The first conidium then produces another, more oval in shape, from its apex, and this second conidium produces a third in like manner. The conidiophores of cultures about one week old are all of this type, *i.e.*, a single short chain of three to four oval spores joined together by the little projections described above (fig. 50(9)). The terminal spores of the chains are nearly always round rather than oval (fig. 50(3)). The necks between two adjacent spores in a chain are only visible when they lie in a horizontal plane. They escape observation when the chain lies in any other position.

In fig. 50(8) the formation of a conidium in a chain of spores is shown. A small protrusion appears on the end of the last formed spore. This soon becomes egg-shaped, the distal end being the smaller, and the base is narrowed to a slender neck connecting with the spore below. The newly formed spore soon rounds itself off and becomes oval in shape. After the production of a single chain of three or four spores the conidiophore invariably forms two or three more chains of spores which arise from the end of the conidiophore close to where the first spore was produced, and in exactly the same way as that spore (fig. 50(4)). The first formed, rather elongated spores also produce two or three

chains of spores from their distal ends and close to where the first chain was formed (fig. 501).

The branches of the conidiophore and the elongated basal spores of the chains are, when mature, indistinguishable in shape and size. They frequently become one-septate (fig. 491). Eventually the fully developed conidiophore with its numerous (ten or more) chains of oval spores presents a tufted appearance, seen under the low power of the microscope, similar to that presented by the *Hormodendron* type of *Cladosporium herbarum*. The only differences to be noted between the two are the absence of colour in the species now described and a slightly larger size of all the parts.

Comparisons made between the conidiophores formed in hanging drops and those produced on the leaves showed no difference. Inoculated sweet pea leaves were severed from the plants when the spots were about 1 mm. in diameter and kept in a damp chamber with their cut bases in contact with a drop of water on a slide. Such leaves remained turgid for several days, and meanwhile the spots increased in size. Under the lower powers of the microscope the daily increase in number and size of the conidiophores could be observed. The smallest spots (less than 1 mm. across) do not bear conidiophores, and present an unbroken but colourless surface (see below). A day or two later one or more colourless hyphae protrude through the stomata in the centre of the whitened area. These are the first conidiophores, which rapidly produce a few chains of spores and then commence to branch and form more chains of colourless oval spores. More and more conidiophores emerge from the stomata in an ever-widening circle, and finally conidiophores spring from between adjacent epidermal cells, so that the surface of the leaf itself is nearly hidden by the little tufts of spore chains.

Examination of Microtome Sections of Diseased Leaves.

From some of the inoculated leaves a number of spots $\frac{1}{2}$ mm. to 3 mm. across were cut and fixed in absolute alcohol, in which they remained for three hours. The absolute alcohol was changed twice during the next half-hour, and the material was then transferred to a mixture of absolute alcohol, xylol, and paraffin, corked up and allowed to remain overnight in the paraffin oven.* Finally, the cork was withdrawn and the mixture allowed to evaporate within the oven. After forty-eight hours the material was in pure paraffin wax and was embedded in the usual way. Sections were cut 8μ to 10μ thick and stained with Haidenhain's iron alum haematoxylin and counter-stained with Congo Red.

In fig. 49 is represented a diagrammatic view of the cross-section through one of the spots. From this it will be seen that the largest

* DOWSON, "A New Method of Paraffin Infiltration," Note, *Ann. Bot.*, No. cxliv. 1922.

portion is much depressed on both sides and is surrounded by a ring of tissue, which gradually widens out and merges with the rest of the leaf. Under the lower powers of the microscope the central depressed area is seen to be composed of collapsed dead cells, and the remains of tufts of conidiophores arising from both margins. The walls of the collapsed cells appear reddish and their contents purple in colour, while the mycelium is pale grey to dark blue. In the surrounding ring of tissue which appears wedge-shaped in section (see diagram), some of the cells have collapsed, and contain an amorphous mass parallel to their walls and deeply stained with the haematoxylin. In the same area rather more cells still retain their normal outline but contain patches of deeply stained substance; while the rest appear to be quite normal and are stained pink with a darker, almost purple nucleus. In between the cells with deeply stained contents the mycelium is fairly abundant as fine branched hyphae measuring 2μ in width. Careful searching of such sections revealed hyphae at some considerable distance from the depressed area in what otherwise would appear as healthy tissue. Fig. 49 shows drawings made with the aid of the camera-lucida of the mycelium at such places, which are also indicated by the letter "x" in the diagram referred to above. The host cells appear as yet unaffected by the presence of the mycelium, the hyphae of which pursue a sinuous course in the intercellular spaces, and are not so branched as in the tissue nearer the central depressed area. The walls of the host cells are stained pink, the chloroplasts are darker in colour, and the nuclei almost purple, while the mycelium varies from red to pale blue-black. The leaf tissue in the area "x" shows no sign of collapse, and the two edges of the section are quite parallel. Conidiophores are seen to spring from that part of the host tissue containing collapsed and dead cells with deeply stained contents. From the central and dead area they arise in great profusion, but from the ring of surrounding tissue the conidiophores emerge only from the stomata. In the respiratory cavities of such stomata the hyphae bunch themselves together and form a plug just beneath the guard cells between which the conidiophores pass to form the tufted spore-bearing portion observed on living leaves (fig. 51A). Sections cut 10μ thick through the smallest spots - those just visible to the naked eye - which simulate the appearance of thrips injury, show gaps between the epidermis and the mesophyll, a few cells of which have collapsed (fig. 51B). These gaps extend beneath 4-6 epidermal cells both in width and length, which appear normal, and in depth 3-4 cells of the mesophyll, the collapsed cells of which form an air space. The epidermis is in no way depressed above these air spaces, which presumably cause the spots to appear white. A small amount of mycelium lies among the debris of these gaps and also extends into the surrounding tissue.

The details of infection have not yet been worked out in sufficient detail to be included in the present paper, and will form the subject

of a further communication. Enough has been done, however, to justify the assertion that the germ tubes of the spores penetrate the epidermal cells and pass straight through them to the underlying mesophyll.

It is reasonable to conclude, from the distribution and nature of the mycelium in and around the diseased spots, that the fungus concerned is (under glasshouse conditions) a well-marked parasite which invades healthy tissue and spreads outwards in an ever-increasing circle. At the advancing edge of the mycelium the hyphae exert for the time being no observable detrimental effect upon the surrounding host cells, but these are subsequently destroyed.

The Name of the Fungus and its Systematic Position.

When the diseased sweet pea leaves were first received from the glasshouse grower and examined, the present author wrote across the letter accompanying the specimens the words "this is a *Cladosporium*." A few of the leaves were sent to Mr. F. T. BROOKS, who was working with this and other genera in connexion with the mould growths of frozen meat. Mr. BROOKS subsequently informed the author that he had grown the sweet pea fungus in hanging drops in parallel cultures with *Cladosporium herbarum*, and that except for the absence of colour he was unable to find any distinction between the two.

BROOKS's paper published later * has cleared up in masterly fashion many of the difficulties of the pathologist—as opposed to the systematist—when working with such genera as *Cladosporium*: and he has shown that many of the so-called species are in reality nothing else but *C. herbarum*.

At Wisley the sweet pea fungus was also compared with *Hormodendron cladosporioides* (which BROOKS has shown to be the same as *C. herbarum*—see the above-quoted paper), obtained from two sources. One strain of *H. cladosporioides* was isolated from a number of rose shoots which were under examination for a certain die-back disease, and the other came from some dried leaves of *Coffea arabica* sent from Kenya Colony. The only difference to be observed between the conidiophores and the conidia of the Hormodendrons and the sweet pea fungus was in colour and in size. Whereas the sweet pea fungus was quite colourless, the other two were tinted, one an olive-green, the other a pale grey. The conidia of the two Hormodendrons were similar in dimensions, and measured 2μ - 5μ long by 2μ - 3μ wide. In all other respects the three fungi presented a very close similarity with one another. The spores of the two Hormodendrons were provided with the same polar projections already described in the sweet pea fungus. BROOKS (see the paper quoted above) describes similar connecting pieces in the many strains of *Cladosporium* with which he worked, and they have been observed in other genera, such

* *Loc. cit. ante*, p. 212.

FIG. 48.—SEEDLING SWEET PEAS ARTIFICIALLY INFECTED WITH MILDEW.



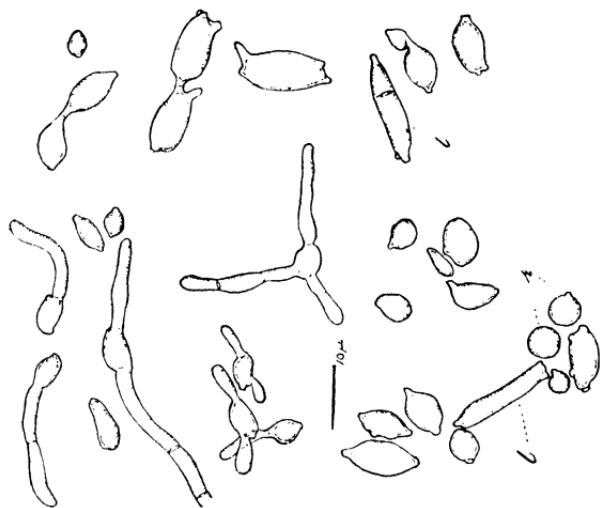
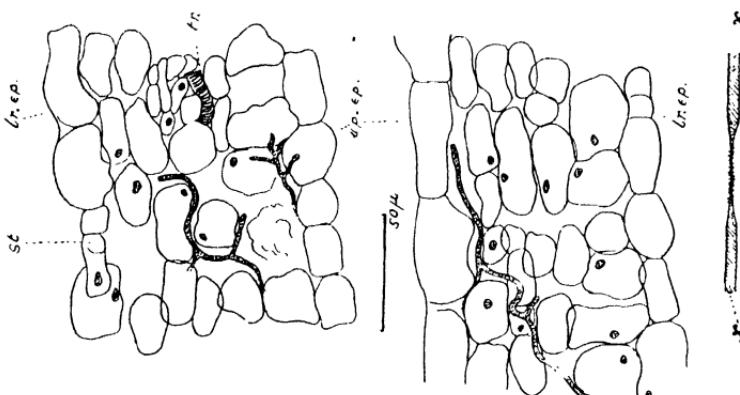


FIG. 49.—CLADO-FORITUM ALBUM.
Right: Spores and Spore Germination.
Left: Section through Diseased Leaf.
For references see text.



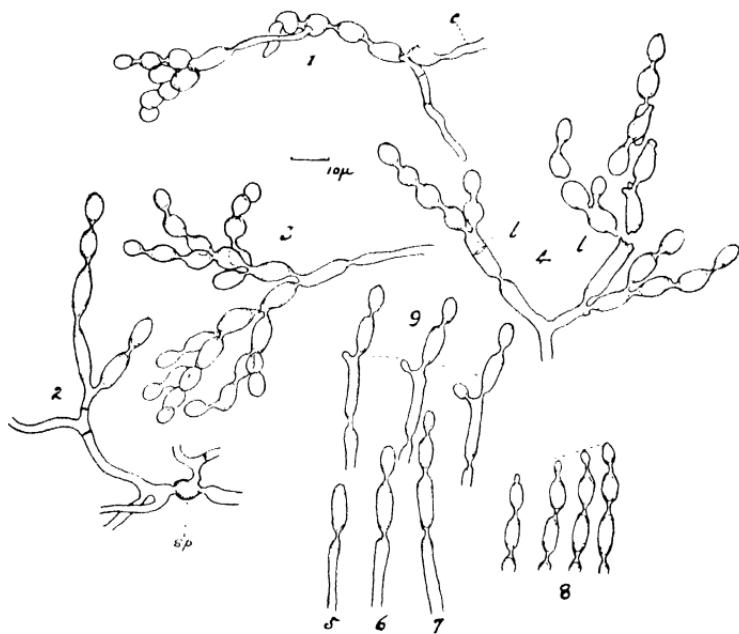


FIG. 50.—*CLADOSPORIUM ALBUM*

Top: Formation of Spores
Bottom: Spores fixed and stained.

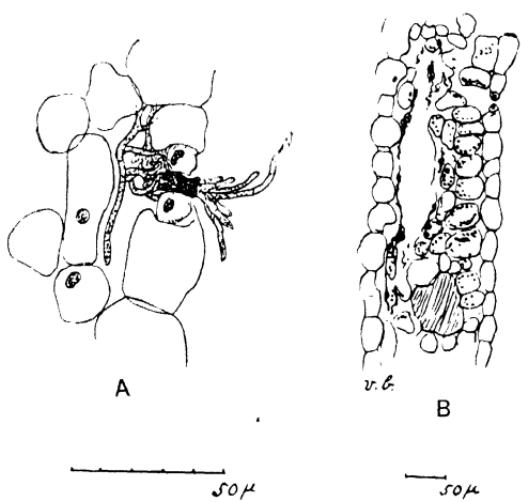


FIG. 51.—THE FUNGUS, *CLADOSPORIUM ALBUM*, IN TISSUES
OF SWEET PEA LEAF.

[To face p. 210.]

as *Mycosphaerella* and *Heterosporium*.* They are perhaps characteristic of the Dematiaceae, although it has been recently alleged that they are absent in *Hormodendron chlorinum* var. *nigrovirens* (Fresen.) Sacc.† In this note ROBERTSON neither refers to BROOKS's work nor does he bring forward any evidence that the form described as a new record for Britain is anything else than *Cladosporium herbarum*. His figure would lead one to suppose it to be that species.

At the request of Mr. A. D. COTTON, who had been asked for any information regarding the occurrence of the disease, some infected leaves were sent to Kew and were examined by Miss E. M. WAKEFIELD, who pronounced the conidia and conidiophores to belong to an unusual form of *Ramularia*. Miss WAKEFIELD's diagnosis was confirmed later by Mr. J. RAMSBOTTOM, and the question of the identity of the fungus was discussed at a meeting of the Brit. Myc. Soc. in November 1923. A summary of the paper read by the author at that meeting was published (without any reference to the discussion) later in the *Gardeners' Chronicle*.‡ At the above-mentioned discussion, although it was admitted that in shape, form, and mode of growth the sweet pea fungus was indistinguishable from *Cladosporium*, and also that the spots on the leaves were not clearly defined, as they are in *Ramularia*, by a coloured margin, yet the fact that it was devoid of colour was considered sufficient to exclude it from the Dematiaceae. This appears to the author to rely far too much upon one particular character, namely, colour, which in itself is variable in any group of organisms : besides which the hyphae penetrating the substratum of old cultures of the sweet pea fungus are slightly tinted. BROOKS (in the paper quoted above, pp. 118, 120) states, under the morphological characters of *Cladosporium herbarum*: (a) "Hyphae—in colour they vary from hyaline to almost black, according to age and strain ;" (b) "Conidiophores—in some strains they are comparatively light ;" (c) "Conidia—in some strains . . . the conidia never become very dark in colour. . . ."

Again, RABENHORST§ says of *Ramularia*—"less often pale coloured," and of *Cladosporium*—"nearly hyaline to black . . . conidia one-celled, typically two-celled, but also up to four-celled." Moreover SACCARDO does not give such precedence to colour in his admittedly artificial system, but regards the septation of the spores as the most important character. In the fungus under discussion the spores are always without septa, if one excepts the elongated branches of the conidiophore which become one-septate. Hence according to SACCARDO it cannot be a *Ramularia*, which has typically many-septate spores. The genus *Cladosporium* is much more clearly

* KLEBAHN, "Haupt und Nebenfruchtformen der Askomyzeten," 1918 ; and DOWSON, "On Two Species of *Heterosporium*, particularly *H. echinulatum*," *Centralbl. f. Mycologie*, Bd. i. 1913.

† ROBERTSON, "*Hormodendron olivaceum* (Corda) Bon. A New British Record," *Brit. Myc. Soc. Trans.*, vol. 9, pt. 3, 1924.

‡ "A New Disease of Sweet Peas," *Gard. Chron.* vol. 75, Jan. 5, 1924.

§ RABENHORST, *Kryptogamen Flora*, vol. 1, Ab. 8.

defined and recognized than is *Ramularia*, with regard to which mycologists are insistent as to the necessity of a revision. Thus WOLLENWEBER* recounts the vicissitudes through which *Ramularia* has passed since its first recognition by UNGER in 1833. UNGER did not give a generic diagnosis, although he called his two fungi *R. pusilla* and *R. didyma*. CORDA in 1842 supplied this want and took *R. pusilla* as the type. The spores of this form are continuous and *not* in chains. In 1863 FRESENIUS amended CORDA's diagnosis to include not only septated spores but also spores which hang together in short chains. According to WOLLENWEBER,† FRESENIUS is responsible, therefore, for the inclusion in the genus *Ramularia* of such forms with septated spores in chains which have since been shown to be the conidial stages of various species of the ascomycete *Mycosphaerella*, e.g. *R. Tulasnei* and *M. fragariae*. These, as WOLLENWEBER rightly points out, differ essentially from the type forms, *R. didyma* Unger and *R. macrospora* Fres. In another paper WOLLENWEBER ‡ emphasizes the importance of chlamydospore formation, which he states *Ramularia* of UNGER possesses in pure culture, but which the similar conidial form of *Mycosphaerella* does not. In the sweet pea fungus chlamydospores are not formed, and if this can be regarded as a valid diagnostic character it cannot be a *Ramularia*, but may be the conidial stage of an ascomycete.

KLEBAHN § gives figures of the conidial stages, mostly from pure cultures, of several species of *Mycosphaerella* which bear a close resemblance to those given in the present paper (*cf.*, for example, KLEBAHN's figs. 36, 45, 48, and 50, with figs. 49, 50 above), and quotes BREFELD|| as referring such conidial forms to the genus *Ramularia*. BREFELD's figure is not very convincing, and that KLEBAHN was also not quite satisfied is evident from his further statement ¶ "that now the perithecal stages have been found there is no purpose in giving them special names," and contents himself by referring such forms to the conidial stages of certain ascomycetes. He also emphasizes (p. 131) the great desirability for a complete revision of the genus *Ramularia*.

LAIBACH ** also gives figures of " *Ramularia* " conidiophores somewhat similar to those of the sweet pea fungus, in that they give rise to branched chains of spores (see his figs. 10, 11, and 12), provided with projections. They are, however, all elongated and some are quite cylindrical. He has shown them to be the conidial stage of *Mycosphaerella*.

BROOKS has pointed out (see the paper quoted above) that the

* WOLLENWEBER, "Abgrenzung von Pilzgruppen," *Phytopath.*, vol. 3, p. 207, 1913.

† *Loc. cit. ante.*

‡ WOLLENWEBER, "The Fusarium Problem," *Phytopath.*, vol. 3, pp. 27, 33, 1913.

§ KLEBAHN, "Haupt und Nebenfruchtformen der Askomyzeten," 1918.

|| BREFELD, *Untersuchungen*, 10, 213, 1891, Taf. 6, Fig. 40.

¶ KLEBAHN, *loc. cit.*, p. 91.

** LAIBACH, F., "Untersuchungen über einige *Ramularia*- und *Ovularia*-Arten und ihre Beziehungen zur Askomyzengattung *Mycosphaerella*. I. *Ramularia*," *Centralbl. f. Bakteriol.*, Abt. 2, 53, p. 548, 1921.

majority of "species" of *Cladosporium* given in RABENHORST are named from the material upon which they were found, and that the little morphological differences upon which they have been founded are also seen to occur in one and the same form when grown under strictly controlled conditions. The same thing has been demonstrated in other genera (*Septoria*, *Colletotrichum*, etc.) by STEVENS and HALL.*

The lesions caused by Ramularia and the Ramularia-like conidial stage of certain Mycosphaerellas are usually small and well defined, while those of the sweet pea fungus are not, but are very similar to those due to *Cladosporium fulvum*, again except for colour. There is a *Cladosporium* given by RABENHORST as occurring on pods of living pea (*sativum*) and bean (*Vicia*). But the conidiophores are light smoke coloured, the conidia *nearly* hyaline but generally two-celled and containing two oil drops. In the sweet pea fungus no oil drops were ever seen, and repeated trials to infect *Pisum sativum* and also *Lathyrus aphaca* failed.

The fungus dealt with in this paper is, apart from its lack of colour, indistinguishable from *Cladosporium herbarum* in its morphological characters, but because of its marked parasitic nature it is considered desirable to give it specific rank, and the name *Cladosporium album* is proposed. The diagnosis being:

***Cladosporium album* sp. nov.** *A Cladosporium herbarum (Pers.) Lk. simile sed album.*

In conclusion, the author wishes to express his thanks to Miss WAKEFIELD, Mr. RAMSBOTTOM, to Mr. BROOKS, and to Dr. BUTLER for many helpful discussions and for literature regarding this interesting parasite; and to Mr. GOULD, of the Wisley staff, for the photographs here reproduced.

Summary.

The occurrence of a new disease of sweet peas under glass is recorded. The fungus concerned has also been found on sweet peas grown out of doors. A mildew-like appearance is produced on the leaves and wings of the stems.

The fungus was isolated and grown in pure culture, and its parasitic nature was proved by repeated infection experiments on sweet pea plants under glass.

No infection was obtained on *Pisum sativum* or on *Lathyrus Aphaca*.

High temperature and a moist atmosphere are the important factors concerned in the spread of the disease, particularly under glass.

Protection from infection can be obtained by dusting the plants with sulphur in a fine state of division.

The fungus was studied carefully in the laboratory, and reasons are given for considering it to be a *Cladosporium* rather than a Ramularia.

The name *Cladosporium album* sp. nov. is proposed.

* STEVENS and HALL, "Variation of Fungi Due to Environment," *Bot. Gaz.*, vol. 48, p. 1, 1909.

“INDEX KEWENSIS.”

DR. B. DAYDON JACKSON has written an account (p. 224) of the making of “Index Kewensis,” which we are sure will prove interesting and valuable to all who know and use that great and indispensable work.

“Index Kewensis” is “an enumeration of the Genera and Species of Flowering Plants from the time of Linnæus to the year 1885 inclusive, together with their Authors’ names, the works in which they were first published, [and] their native countries,” as the title-page informs us. Supplements have been published, making the list complete until 1915, and arrangements have been made to publish further supplements from time to time to keep it up to date.

Until it appeared those whose work involved the use of plant names were severely handicapped, for to find the names which had been applied by different authors in even one genus meant search through many volumes, and, indeed, the compilation of an index for oneself, and always the doubt existed whether all possible sources of information had been tapped. “Index Kewensis” makes this search unnecessary, and with its supplements practically removes all doubt as to the completeness of the record. It is this saving of time to all workers with plant names that makes the book indispensable. The completeness and accuracy with which its compilation was carried out makes it a great book. Its use makes one wonder at the amount of work achieved without it, considering what an immense aid it is.

To all of us it is an invaluable guide to the accurate spelling of plant names—and who does not feel the need for such a guide at times? The writings of many who do not realize that need would be the better if they consulted the Index.

The Index is, however, more than a mere list of accurately spelt names. It gives the author of each of the names, and the place where he published a description of the plant to which he attached it. Thus, if any doubt exists as to the accuracy of a name, the place of original description can be found, and any doubt resolved so far as the description can resolve it. For instance, perhaps a question arises concerning the identity of *Primula marginata*. The Index at once refers us to Curtis, who described it in the *Botanical Magazine*, t. 191, where we can find not only a brief description but a figure as well. The Index further informs us that a second species has been given this name, but reference to the work in which this was mentioned shows that the name was of later date than Curtis, and so it cannot stand. Unfortunately, the dates of publication have not been given in the earlier volumes of the Index, but this fault has been rectified in the latest supplements.

Another use to which the Index can be put by the horticulturist is to discover therefrom the area over which plants of a genus are spread. A species of Oxalis, say, *O. enncaphylla* or *O. floribunda*, may have taken his fancy, and he determines to grow all the species of Oxalis procurable. He acquires several from friends or by purchase, but desires more and turns to the Index, where he finds a list of seven or eight hundred names. He soon learns that many species grow in Chile and Peru or Brazil, but others in South Africa, Madagascar, or Mauritius, and he can direct his inquiries and search accordingly.

In the first volumes of the Index an attempt was made to indicate synonyms, but this was a mistake. The most that could be done was to indicate the views of one particular person upon this question, and this led to unforeseen difficulties. The attempt was abandoned in later supplements and this source of misunderstanding removed. Those who write that, "according to 'Index Kewensis'" such and such a name is a synonym for such another, misconceive the proper purpose of the work, which is simply an Index, and should be used as such only. It is not an "authority" of itself upon any matter.

THE HISTORY OF THE COMPILATION OF THE
"INDEX KEWENSIS."

By B. DAYDON JACKSON, Ph.D., Gen. Sec. L.S.

SINCE the completion of the "Index Kewensis" in 1895 I have been repeatedly urged to give an authoritative account of the compilation of that work, to supplement the inadequate statement which Sir Joseph Hooker prefixed to the first portion printed. I had other and important work in hand for long after the issue—my share in the first Supplement, the three editions of my "Glossary," and other works, with lastly the writing of "Linnæus." Meanwhile, the passing of many who helped in the long labour of compiling the "Index," the retirement of others from official work, and my own increasing years, warn me that if the narrative is to be printed it must be taken in hand without further delay.

It was on December 8, 1881, that Sir William Thiselton-Dyer, K.C.M.G. (then Mr. Thiselton-Dyer), after a committee meeting at the Linnean Society, first broached the subject of a new edition of Steudel's "Nomenclator." He stated that Mr. Darwin had profited so much from that work, though it was forty years old, that he was prepared to give a sufficient sum annually for several years if a proper person could be found to compile the vast number of names published since its issue, and if some guarantee could be given that it should be finished in a definite period. My recently issued "Guide to the Literature of Botany" had impressed Sir Joseph Hooker, who thought that I had a sufficient knowledge of the subject to qualify me to undertake the task in question. Although attracted by the prospect, I realized that it would be a long and arduous work, but I promised to consider the project carefully.

Three days later I wrote to Mr. Thiselton-Dyer saying that I had thought out a plan which seemed feasible, and after further correspondence I went to Kew on December 14 and laid my plan before Sir Joseph, and my estimate of the cost for stationery, clerical help, and a few books, together with regulations for my proposed helpers. I emphasized the desirability of giving references to all the names, pointing out that a work on Steudel's plan, based solely on synonymy, would in no long time become out of date, whilst an enumeration of genera and species, with their place of publication during 150 years, would be of permanent value. Sir Joseph was impressed by this view, and at once remarked that "it would quadruple its value." The further suggestions were made that the work should be compiled and the manuscript be housed in the Kew Herbarium, and I estimated the period required would be six years. This plan was forwarded to Mr. Darwin, who expressed himself delighted with it,

and I then began to make my preparations for beginning, the first authorization reaching me before Christmas. By the middle of January my detailed plans were approved, and I received the first instalment of money towards the work. Besides the requisite stationery, I had to procure certain volumes for constant use, such as Bentham and Hooker's "*Genera Plantarum*," so far as it was published (the final part of the third volume not appearing before April in the following year), Pfeiffer's "*Nomenclator*," and De Candolle's "*Prodromus*," with Buck's "*Index*"—the last two works being the gift of Mr. Frank Crisp. On February 3, 1882, I unpacked at Kew the various parcels which there awaited me, and the following day I began work with my two young clerks. They transcribed the genera from Bentham and Hooker, each retained genus being followed on the sheet by the sunk genera, and each sunk genus repeated separately on its own sheet, with a cross-reference to its maintained genus. I had to check their work as it went on, but unfortunately a few days after beginning, Mr. Bentham gave up travelling by train, and I lost my opportunity of consulting him on the journey, as thenceforward he drove down to Kew and returned in his carriage.

On April 20 I heard of the death of Mr. Darwin the day before, and it was always a matter of regret to me that I had no opportunity of reporting to him the progress we were making.

After six weeks' work the sheets were ready for sorting into alphabetical order and storing in boxes of foolscap size with falling fronts, and then began the task of copying the specific entries on these sheets and enclosing them in stout wrappers with the name of each genus on the left bottom corner. The source of these names was the Kew interleaved copy of Steudel's "*Nomenclator*," which had copious additions, as all plants determined and laid into the Herbarium were entered as they were incorporated. A third clerk was now added to the staff—a Swede, who was very quick and accurate. The ruled sheets provided several lines between the species for intercalations. About 30,000 covers were needed, and by the time the transcription was done 168 boxes were in use, lodged in pigeon-holes for ready reference. During this procedure I was mainly searching such old volumes as previous experience warned me would require special attention. These preliminaries consumed eighteen months, and then began the insertion of references, beginning with the works of Linnaeus, for which Richter's "*Codex Linnaceanus*," with Petermann's "*Index*," proved of great help, then De Candolle's "*Prodromus*" and "*Monographia*," Kunth's "*Enumeratio*," Walpers's "*Repertorium*" and "*Annales*," which gave a good foundation. Next floras of large extent were used, such as Bentham's "*Flora australiensis*," Martius's "*Flora brasiliensis*," Ledebour's "*Flora rossica*," Hooker's "*Flora of British India*," and Boissier's "*Flora orientalis*." After these great storehouses were exhausted, smaller works and journals were entered, the latter being copied from special small slips I had prepared, the titles on each being printed with rubber-faced type, and then

sorted alphabetically. The same type was used when entering on the sheets, thus ensuring strict uniformity. A slip of the title of each work searched was written and kept in alphabetical order, a necessary precaution as the time available did not permit of the entire literature being searched. By experiment I found that up to 1850 practically all names were accounted for in the main works consulted, but from that year every endeavour was made to extract new species and names from original works to the end of 1885, a period of 150 years from the first edition of "Systema naturae," by Linnæus. In addition to the Kew library it was requisite to make use of other libraries, such as those of the Linnean Society, British Museum at Bloomsbury, and at Cromwell Road, the last being rich in botanical works and (in the general library) in journals. Notwithstanding every effort, some works escaped us, others could not be found in London, and some were fragmentary.

In spite of my quarterly and annual reports, the interest of Sir Joseph Hooker in the undertaking was awakened slowly. It was with difficulty that I induced him to audit the first year's account, and from that time onward he readily accepted my statements. In 1885 a conference in his study was convened for discussing the geographic statements to the species. I deprecated throwing the whole into the melting-pot, for we had the references to origin from Steudel, and could repeat the localities given by the authors cited. I could hardly be expected to revise them, in addition to the task of compilation originally undertaken. Finally, Sir Joseph himself undertook to revise that part of the MS., which he did systematically at a later period.

As time passed, and the MS. was found, even in its incomplete state, very useful to workers in the Herbarium, a committee, consisting at first of Sir Joseph Hooker, Prof. Daniel Oliver, and John Ball the alpinist, used to meet occasionally to discuss knotty points and take stock of the progress. Some years after, in 1889, W. Botting Hemsley was added to the committee, and then my reports commented on the revision already begun, though much remained to be incorporated.

At the end of the fifth year I published an account of the work done in the *Journal of Botany* for 1887, although it was then evident that the six years I estimated would be exceeded. To test the thoroughness of the compilation, C. B. Clarke, who had been engaged upon the study of Cyperaceae for some years, undertook, unknown to me, to examine the genus *Scirpus*, upon which he reported favourably.

By the middle of 1889 the work of incorporation was completed, and the project of printing was taken in hand, whilst revision was being pushed on. My assistants from time to time furnished lists of genera, and on these Prof. Daniel Oliver gave his advice as to monographs and local floras for the revision. I must here put on record the Professor's unstinted and most valuable help all through our work in this important department. After an abortive attempt

to induce the Cambridge University Press to undertake the publication of the "Index," Sir Joseph Hooker corresponded with the Rev. Prof. Bartholomew Price, one of the Delegates of the Clarendon Press at Oxford, and ultimately an agreement was drawn up and signed, making over the copyright of the "Index" to the Clarendon Press, in return for printing and publishing the entire work. But in 1891 Sir Joseph made a proposition which astounded me ; he then suggested numerous alterations in the citations of certain well-known works, which would have greatly hindered the completion of revision. I protested, and finally, bowing to the opinion of many distinguished botanists, Sir Joseph gave way, and we continued revising along the lines followed hitherto. About this time I drew up a sketch of an introduction to the "Index," but Sir Joseph disapproved of any introduction, adducing the case of Steudel's second edition, in which not a word of introduction was printed. The short preface which was printed was entirely his own, and, if compared with the present account, it will be seen to be inaccurate, being drawn up from memory, whilst the present narrative is not dependent upon my own recollection, but is based upon a large number of documents in my possession, the originals of those still preserved at Kew. An addition to the funds in hand was made by Sir George Macleay to Sir Joseph Hooker of £300 for contingencies, which happily was only partially needed, and two-fifths were paid to me as a bonus upon the completion of the printing.

The last step in revision before sending the MS. in detachments to Oxford was checking the cross-references to other genera. The Clarendon Press set aside a small staff to carry the work through, and, when fairly entered upon, two sheets weekly were printed. One assistant and I called over the manuscript against the proof, and by the time this was accomplished Sir Joseph Hooker, who had read the duplicate proof, compared his copy with mine ; the revise was only read by the reading-boy and me.

Shortly before the printing began M. Théophile Durand, a Swiss botanist in the Belgian service at Brussels, offered his manuscript of new species and names, either for incorporation with our sheets or for a Supplement for 1886 to 1890. Sir Joseph Hooker, whilst grateful for the offer, felt that it could not be accepted, for, if it were, it would require acknowledgment on the title-page or payment for the work, for which no funds were available. He therefore suggested that it would be preferable to make up a Supplement covering ten years from the end of the main work—namely, 1886 to 1895. This suggestion was accepted, as will be shown later.

As shown in the appended bibliography, the "Index" came out in four *fasciculi* in cloth, making two thick volumes, but it was also issued afterwards in two volumes in half-morocco.

The great undertaking, thus happily brought to a successful end, was succeeded by my joining M. Durand in compiling his manuscript for the first Supplement, my share being the search through series of

volumes not accessible at Brussels, especially those published in the United States and Britain. To the names thus collated were added the 30,000 new names minted by Dr. Otto Kuntze, reduced so far as possible to the genera maintained in the "Index Kewensis." The printing of this Supplement was long drawn out: the first printer failed after the issue of the first *fasciculus*, and a new one had to be sought; then my colleague had repeated attacks of illness which hindered progress, and, although he agreed to hand over the whole of the manuscript to me to carry it through, ultimately he would not part with it, and at last it was finished. He and I issued the *fasciculi* as they came out, and, when all four had appeared, I received the remaining copies and disposed of them on our joint account, sharing the profits as agreed. After his death, on January 12, 1912, the rest of the copies were sold to the Oxford Clarendon Press, and I had the pleasure of remitting a considerable sum to Durand's orphan daughters in Brussels. With this transaction my responsibility for the "Index Kewensis" ceased. The second Supplement was issued by the Oxford Clarendon Press in 1904-5.

Of the eleven assistants I had at various times, two died during the progress of the work—one at Melbourne and the other off the coast of West Africa—one has been lost sight of, and the rest found other situations. I must, however, mention H. R. Hutchinson, who was one of my staff during twelve years, and is now the Librarian of the Royal Horticultural Society.

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 (Explanatory not only of the system upon which the revision was based, but the views which actuated the compiler; appended is a statement contributed by Sir Joseph Hooker, which does not agree with the detailed account above given.)
 — Index Kewensis plantarum phanerogamarum nomina et synonyma omnium generum et specierum a Linnaeo usque ad annum MDCCCLXXXV complectens nomine recepto auctore patria unicuique plantae subjectis. Sumptibus beati Caroli Roberti Darwin ductu et consilio Josephi D. Hooker confecit B. Daydon Jackson. Fasc. I. [4to. Pp. xvi + 728. Aa—*Dendrobium eviguum.*] Oxonii e prelo Clarendoniano. [Sept. 6.] MDCCXCIII. £2 2s. net.
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 (The MS. is bound in 128 foolscap folio volumes at Kew, with an additional volume of "Correspondence.")

— Indicis Kewensis Supplementum primam nomina plantarum phanerogamarum omnia annis 1886-1895 edita complectens.
 Fasc. I. [Bruxellis. 4to. Pp. 120. *Aalius*--*Cymbidium pulcherrimum*. Apr. 1901.]
 Fasc. II. [Ib. Dec. 1, 1902. Pp. 121-224. *Cymbidium sikkimense*--*Iriha apus*.]
 Fasc. III. [Ib. Nov. 20, 1903. Pp. 225-328. *Iriha Arnottiana*--*Physaria*.]
 Fasc. IV. [Ib. Pp. 329-519. *Physidium*--*Zizyphus*, in Emendandis. Titulus.]

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— [Review of.] Revisio generum plantarum vascularium omnium atque cellularium multarum secundum leges nomenclaturae internationales cum enumeratione plantarum exoticarum in itinere mundi collectarum. Mit Erläuterungen von Dr. Otto Kuntze. Leipzig. 1891. Pp. clv + 1011. 2 vols. 8vo. £2.
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NETTLE-HEAD OF BLACK CURRANTS: A REVIEW.

By F. J. CHITTENDEN, F.L.S., V.M.H.

BIG-BUD disease of black currants has been recognized for many years as a distinct menace to their cultivation, and not a few have given up growing this useful fruit because of the damage done by the mite which causes it. Comparatively resistant varieties have more or less saved the situation and, together with repressive measures, imperfect in effect though they may be, have enabled black currant growing to be carried on with greater or less success.

Attention has more recently been forcibly directed to another trouble which does not appear to have been recognized and which probably did not exist to any marked extent until a few years ago. Now it has attained marked proportions and bids fair to outrival "big bud" as a menace to black currant growing.

"Big bud" was so called because buds invaded by the mite, *Eriophyes ribis*, attained during autumn and winter more than the normal size. In spring these abnormal buds failed to develop flowers or shoots (unless very weakly ones), opening merely to liberate a lively horde of mites ready to infect new buds on developed shoots. For new shoots did develop from buds that had escaped severe infection, and flowers and fruits were produced, although often in quantities falling far short of what would constitute a full crop.

With this newer trouble, however, the whole bush is apt to be diseased, and although it may and usually does grow freely flowers are adversely affected and the crop is greatly reduced. The stage of fruitlessness is not immediately reached as soon as the foliage shows the peculiar condition to which the name used in the title of this note applies, but the bushes become progressively less fruitful, and often quickly reach an unprofitable state. Not only does this happen, but recovery appears to be unknown, and parts of the diseased bush used for propagation reproduce diseased bushes incapable of cropping well. The very vigour of the diseased bushes is a menace to the grower, for more cuttings may often be obtained from the diseased bush than from the normal one, and, as a consequence, the disease having passed unrecognized, large numbers of the diseased bushes are spread over the country. This has been nobody's fault, for in nurseries the fruitfulness of bushes used for stock cannot usually be ascertained, and it is only recently that the necessity for a close examination of the stock plants during the growing season has been recognized. With an accurate diagnosis of the trouble, however, the propagation of the diseased bushes will be a fault, and the careful scrutiny of the bushes used for propagation at a time when the disease can be recognized, a duty.

The curious appearance of the foliage of diseased bushes has suggested the name "nettle-head," or sometimes "nettle-leaf," but the term "reversion" is far more commonly applied to the trouble. This is unfortunate, for it suggests an untruth. It conveys the idea that the bush has gone back to a condition which its ancestors showed in some more or less remote past. This is untrue. Varieties of plants propagated vegetatively do not revert. Bud sports certainly occur at times, and the sport may be more like one of the former parents than was the plant which produced it. The plants now referred to, however, are no more like the wild ancestor than is a normal cultivated variety, and the incidence of the trouble is entirely different from that usual when "sporting" occurs. The idea, however, that a change resulting in unfruitfulness or the production of worthless fruit is reversion to a former condition is as common as it is erroneous.

"Nettle-head" is, on the other hand, an admirable name for the condition, for it describes well the general appearance of the foliage of a diseased bush, and this appearance being so marked puts it into the power of the nurseryman to do a great deal, not to cure the disease, for both cause and cure of the malady are unknown, but to restrict its propagation.

It is some time since the disease began to attract attention, and there has been a fairly general belief that the trouble is in some way or other connected with the attacks of the big-bud mite, but in spite of this belief the fact is not yet established, nor is the connexion by any means clear. The most suggestive connexion appears to be that after a bush becomes diseased big buds seem to be unfailingly found upon it. Which is cause and which effect is not clear, nor indeed whether one is cause and the other effect.

Others have supposed that any cause bringing about damage to the terminal bud of the leading shoots would cause the "nettle-head" to appear, and it may well be that there is some truth in the idea, provided the damage is done by certain agencies, but experiments made at Wisley leave no doubt that mere mechanical injury to the terminal bud will not alone cause "nettle-head."

Characteristic as the narrow, pointed foliage of the diseased bushes is, there is sometimes a risk of mistaking varietal characteristics for it. Mr. LEES, of the Long Ashton Experiment Station, has shown that in diseased bushes the number of main lateral veins in the leaves is less than in the normal healthy leaves, and that the toothing is less pronounced, and this may be taken as a guide to the recognition of the trouble. Unfortunately, these characters also are no absolute guide, for the leaves on diseased bushes, both early and late in the year, do not show this distinction well, and other causes, such as bad weather or poor soil, interfering with the proper growth of the bushes, may also bring about a reduction in the number of the veins. When this reduction is brought about by one of the external conditions referred to, on the recurrence of better conditions the new leaves produced

have their normal number of main lateral veins. It is thus easy to make a wrong diagnosis if this condition is too strenuously adhered to. It is furthermore one that can hardly be applied to young bushes in the cutting bed, where abnormal growth is frequent.

Diseased bushes often branch more copiously than healthy ones, and the buds formed in early summer often grow out into shoots before autumn is past. This again may be the result of mechanical injury to the upper buds, or of extra vigour, or of an over-abundant supply of water, and cannot by itself be used as a mark of the disease.

Mr. SEABROOK has pointed out a character which seems to be a very useful mark by which the disease may be recognized in its early stages—the absence of down on the unopened flowers of diseased bushes or diseased parts of bushes—for at first the disease may be confined to one shoot or even to a part only of one shoot. If bushes be examined with care *when the flower trusses are beginning to lengthen*, this character will clearly distinguish the diseased from the healthy bushes, especially in the varieties with chocolate sepals. The unopened flowers on the diseased bushes are in most varieties dull claret or maroon, while those of healthy bushes are lavender or purplish, as though covered with "bloom," and distinctly lighter in general appearance than the diseased ones. It is less easily seen in the paler varieties of the Victoria type, but closer inspection will reveal it also in these varieties. With the more common dark-flowered varieties, diseased bushes may be recognized at a glance a yard away. The foliage of these bushes will at this stage be found to be somewhat mottled and will appear lighter than that of the healthy ones.

At present, therefore, the only available means of restricting the trouble is to propagate only from healthy bushes, and the recognition of healthy bushes is best done while the bushes are beginning to flower, aided by the appearance of the foliage in June. This method involves the leaving of a certain amount of flowering wood in the stock bushes. All plantations of black currants from which it is intended to take cuttings should be examined at these times, and those showing loss of down from the flower buds and abnormal foliage should be destroyed. Only by this means can healthy stocks be secured. No guarantee can be given that the plants raised from healthy cuttings will not contract the disease before they are distributed or after they are planted, but the method will avoid the propagation of already diseased plants, which can in no circumstances become healthy ones, and it is important that all nurserymen should use this means of securing more healthy stocks.

THE AWARD OF GARDEN MERIT. IV.*

23. IRIS UNGUICULARIS.

Award of Garden Merit, January 14, 1924.

NEARLY all Irises are worthy of a place in even the smallest garden, but *Iris unguicularis* is especially desirable, because not only are its flowers beautiful but where it is suitably planted it is imperturbably hardy, and flowers freely all through the winter.

This species grows wild in N. Africa, particularly in Algeria, and in Greece, Crete, and Asia Minor, and like a good many other species with a wide range has several geographical forms, those from the eastern end of its range having much narrower foliage and flowers usually more marked with white than the form from Algeria. Quite apart from these variations, seedlings vary considerably in length and width of leaf, in shade and marking of the flower, and in time of flowering, and a good many names have been used to designate these forms; but the plants "run into one another," and exactness of definition is not easy to achieve: at any rate it has not been achieved. By selecting forms flowering at different seasons it is not difficult to secure flowers for cutting from the end of October (or earlier) until April, and on the whole, perhaps, the paler forms flower first.

In the Director's garden at Wisley, the variety *speciosa*, with rich lilac flowers passing to deep purple on the blade of the falls, is the last to flower, usually in March, but from half a dozen other plants scarcely a day has passed since mid-November, even in the trying winter of 1923-24, that has not provided a bunch of buds to pick. While the typical colouration of the flowers is lilac, white forms occur, and some of the white seedlings have much more "solid" flowers than others. The flowers are very delicate in appearance, and it is better to pick them in bud (and in frosty weather just before the buds emerge from their sheaths) and bring them into the house to open.

At Wisley the plant flowers freely in sunny places, with a backing of shrubs, and in its narrow-leaved form (*I. unguicularis* var. *angustifolia*) in the shelter of rocks on the rock garden, but best of all under the south wall of the Director's house, where it is planted in well-drained sand mixed with mortar rubble and close up to the wall, left alone (except for the removal in spring of dead foliage and of fallen leaves from neighbouring trees in autumn, lest their decay should damage the flowers), and never manured.

All the plants require is a sheltered place in dry and well-drained soil, in full sun. Where planted in soil too rich, the flowers are usually

* For earlier annotated lists of Awards of Garden Merit see vol. 47, p. 189, and 48 pp. 58 and 223.

very few and the foliage very rampant. Where the natural soil is clay and wet, even then success may be achieved if the beds are raised a little above the general level.

The typical plant is figured in the *Botanical Magazine*, t. 5773, and the variety *angustifolia* at t. 6343 as *I. cretensis*.

24. GALANTHUS ELWESII.

Award of Garden Merit, February 25, 1924.

It is by no means easy to foretell whether Snowdrops will grow in any particular garden. They have their peculiar preferences which we cannot at present understand, but the preferences of *Galanthus Elwesii* are perhaps more clearly defined than are those of most other species, and it becomes more easy to say "Plant the bulbs here, and you will be well repaid," for Elwes' Snowdrop is a plant for a sun-baked, well-drained site. If the soil be actually rich, so much the better, but it should not contain too much decaying vegetable matter. There it will produce its large flowers with ample white outer segments, and inner ones marked by a basal as well as a terminal spot of green, with the New Year, and remain in beauty for many days. Its very broad, nearly flat, and very glaucous leaves are quite distinct.

Mr. BOWLES has dealt with the distinguishing characters of this and other Snowdrops in our JOURNAL (vol. 43, pp. 28-36) and has given pictures of the species there. It is therefore unnecessary to repeat them here.

Galanthus Elwesii, where it is suited, increases by its bulbs, although perhaps more slowly by this means than some other species. It is also readily raised from seeds sown immediately they ripen, and plants so raised flower within three years of seed sowing as a rule. Such plants vary a good deal among themselves, and so do those collected in their native Asia Minor; variations are to be seen in the size, shape, and markings of the segments, size and especially breadth of foliage, and in the time of flowering.

Judging from some of the plants in the wild garden at Wisley, Mr. G. F. WILSON grew *G. Elwesii*, and it produced hybrid progeny, which have grown in the orthodox places for Snowdrops, but of *G. Elwesii* itself none of Mr. WILSON's planting remains. Not far away, however, in the very sandy soil of the northern end of the garden, the plants persist, and indeed increase, both by bulbs and seeds. They were planted for the most part in 1911, and put in about eight inches deep, and both those which have been moved at times and those which have been allowed to remain where they were planted have flowered freely ever since.

G. Elwesii has been figured in the *Botanical Magazine* at t. 6166 from plants which the late Mr. ELWES himself collected in Asia Minor.

25. CROCUS IMPERATI. 26. CROCUS SIEBERI.

Award of Garden Merit, February 25, 1924.

Of these two spring-flowering Crocuses, *C. Imperati* is usually the earlier, flowering as a rule in January, *C. Sieberi* following quickly, and both continue in flower for a long time. Perhaps *C. Imperati* withstands better the battering of the winter rains and the alternations of frost and mildness, fog and sun, that so often constitute our climate during the opening months of the year; but *C. Sieberi* flowers so freely that it will always gratify the planter who gives it what both species like—an open place in a sunny, well-drained spot.

These Crocuses should be planted as early as they can be obtained in autumn, and, given a fairly rich, light soil, they will increase freely both by corms and seeds. The latter are always worth sowing, for charming variations can be obtained from seed. White forms of both are known, but the white form of *C. Sieberi* is very rare indeed.

C. Imperati grows wild in South Italy and in some of the islands e.g. Capri, off the Italian coast. Its flowers are buff outside, feathered as a rule with purple, but are, like a good many other spring-flowering bulbous plants, very inconspicuous when closed. On bright days they open and show their bright pale purple inner surfaces, and are both conspicuous and beautiful. The throat of the flower is orange, as are the anthers and the spreading stigmas.

C. Sieberi comes from further east, and is found in the mountains of Greece, Crete, and (according to Dean HERBERT, who gave much attention to Crocuses, and wrote the excellent paper on them which appeared in our JOURNAL, vol. 4) also in a few places in Asia Minor.

The typical Grecian form is pale bluish-purple, passing into orange below, but a form from Crete with beautiful variegated colouring, purple and white, was introduced by Mr. H. J. ELWES. The anthers are orange, and the broad, almost undivided, stigmas orange-scarlet.

27. CORNUS MAS.

Award of Garden Merit, March 24, 1924.

Cornus Mas is another of the early flowering shrubs which are so welcome as winter is passing. Later, as a rule, than the spring-flowering species of *Hamamelis*, it has small bright yellow flowers in close clusters at the tips of its numerous twigs, and a bush in full flower is a fine object, especially against a dark evergreen background.

It is unfortunate that the flowers are not more often followed by the bright red fruits to which it owes its name of Cornelian Cherry, for then it would have a double value. The frequent reference in old garden books (for it has been long in cultivation in England) to the use of its fruits as a preserve would lead one to suppose they were freely produced at one time, but they are comparatively uncommon now, consequently the plant has usually only one period of beauty. There is, however, a prettily variegated form with white

edges to its leaves, some of which may be entirely white, called *variegata*, and another with similar but yellow variegation, known as *aurea elegantissima*, and several other varieties are known. The bush is native of Europe and may attain to 25 feet in height, although this stature is but slowly reached. It was figured in the *Botanical Magazine*, t. 2675.

28. ERICA CARNEA.

Award of Garden Merit, March 24, 1924.

Heaths are by no means easy plants to accommodate as a rule. Lime in any shape is poisonous to them, but *Erica carnea* is an exception and will flourish where most perish. Consequently it is more widely known and grown than any other, and, given well-drained soil with a certain amount of humus in it, *Erica carnea* will flourish and produce its cheerful flowers in the first three or four months of the year, when any flowers are welcome. It is no niggard in its blossoming, but will carpet the ground where it grows with rosy red for months. It is quite hardy and good for beds, or edging of paths, or the rock garden. Its seedlings vary a good deal in shade, and several named forms are offered by nurserymen, many of them very pleasing indeed. There are two or three white forms too. If desired the plants may be kept very compact by clipping them over when the flowers begin to fade.

REPORT UPON TRIAL OF GREASE-BANDING MATERIALS,
1923-24.

THE object of grease-banding fruit trees is to catch (i) the wingless females of certain moths, *e.g.* winter, mottled umber and March, whose larvæ feed on the foliage of fruit trees, and (ii) Woolly Aphides or "American Blight," many of which migrate from the stem to the roots in November and December.

The wingless female winter and mottled umber moths emerge from their pupal cases in October, November and December, and the March moth from the second week in February to the first week in April. The pupal stage is spent in the soil surrounding the trees, and the female moths endeavour to crawl up the trunks to lay their eggs on the young twigs. By using an efficient grease, this migration from soil to tree is very considerably reduced.

An ideal banding-grease is :

- (1) easy of application.
- (2) not unduly affected by weather, *e.g.* :
 - (a) frost, which often hardens the surface.
 - (b) drying winds, which cause the surface to become dried up.
 - (c) drizzling rain, which causes a water-film to form on the surface and the grease to become glazed over.
 - (d) warm weather, which causes some preparations to run.
- (3) "tacky" for at least six months.
- (4) reasonable in price.

The following may make these points clearer :

(1) Ease of application and effectiveness do not necessarily go together, for many efficient greases are difficult to apply. The ease by which a grease is applied is an important factor, for on this depends the rate of application, which will be partially governed by the temperature of the surrounding air.

(2) Weather has a great effect on greases, especially under the influence of (a) frost, which hardens the surface of many preparations. It is frequently suggested that the pests which grease-banding guards against are not active during frosty weather, but on three occasions (November and December 1923), when there was a ground temperature of over 20 degrees of frost and a screen temperature of over 10 degrees, male moths were seen flying and female moths ascending the trees after dusk.

(b) Drying winds, especially from the north and east, have a deleterious effect, causing the surface to become dry and quite useless. On February 14, 1924, we experienced a strong north-easterly wind at 13 m.p.h. which completely dried up more than half the materials submitted for trial.

(c) Drizzling rain induces a water-film to collect on the surface of the grease. The required factor for this glazing over is a high percentage of water vapour in the atmosphere. It does not necessarily follow that this condition occurs after prolonged periods of heavy rain, but it did occur at Wisley every time there was a drizzling rain accompanied by a saturated atmosphere. To quote two instances : (i) on December 12 there was a continued drizzle all the morning with a relative humidity, as shown by the wet and dry bulb thermometer, of 93 per cent. ; most of the greases were covered by a thin water-film causing the surface to lose its stickiness ; and (ii) on January 22, after thirty-six hours' heavy rain and a relative humidity of 82 per cent., not one of the several greases showed any signs of glazing.

(d) Warm weather. A serious fault with some preparations is that they run during the warm days of early October and late March. This defect was observed when the temperature was 63 degrees on October 19.

(3) Condition after six months. An efficient grease should remain "tacky" for at least six months, while some preparations remain efficient for over twelve months. Apart from occasionally examining the bands to comb and remove the dead bodies of moths and other insects, there should be no further application necessary.

(4) Price. The price is always an important factor, but there is little difference between the several preparations. No account has been taken as to (i) cost of labour, (ii) length of time in applying the several materials, or (iii) the amount of material necessary for each band, though the two latter points vary considerably with each particular preparation and air temperature.

Application.

Ten greases were submitted for trial. They were all applied on the same day, October 17, the same grease-proof paper being used throughout the trial. The paper was 5 inches wide, allowing for 4 inches of grease. Six standard trees (four apple, one pear and one plum) were used to each material, two bands being placed on each tree.

The weather was calm with sunny intervals, a mean temperature of 48.5 degrees F. and relative humidity 83 per cent. The mean October temperature for Wisley over a period of twenty years (1904-1924) was 49.2 degrees F.

Examination took place every week, and all leaves were daily removed from October 19 to November 19.

The greases were applied by means of large wooden labels, each preparation having its own label.

The number of female moths caught on any one band forms no criterion as to efficiency, for the numbers vary with each tree.

The maximum number of winter moths caught on one band was 57 (32 males and 25 females).

The chief pests captured on the bands were male and female winter moths, whilst solitary specimens of mottled umber, November, early, dotted border and March moths occurred.

General Remarks.

The operation of grease-banding is often deprecated through the fact that caterpillars are seen on trees which have been banded.

Grease-banding is an important operation in garden work, but its value is limited to capturing the wingless female moths which pupate in the soil, and it is of no use against winged female moths or even against the wingless female Vapourer moth which pupates on the tree.

All standard and half-standard fruit trees should be banded, but in the case of bush trees it is not an economic proposition unless grown in grass, otherwise soil will be splashed up on to the bands and leaves blown against the grease, causing natural bridges.

The bands should be in position the first week in October and remain on to the end of March. It is better to leave them on all the summer, for then many pests are captured, e.g., migrating Woolly Aphides, leaf-eating weevils (*Phyllobius* spp.) and caterpillars of winter and green pug moths.

Grease-proof paper should always be used, even in the case of old trees, on account of the danger of absorption and consequent blocking of the lenticels, resulting in the tree's ill-health.

The bands should not be less than 5 inches wide, allowing for 4 inches of grease.

It is essential to see that the bands are tied tightly round the trunks, otherwise the moths will crawl beneath. If some of the trunks have an uneven surface, the intervening space must be filled with clay or commercial cotton wool.

The height of the bands should be at least two feet from the ground where it is cultivated, and nine to twelve inches in the case of bush trees growing in grass.

In many cases female moths were found on the second band even when the first was satisfactory, the reason being that the female moth is often carried by the male when pairing.

It is not suggested that once the operation of banding is completed that no more attention need be paid to the bands, for in bad attacks the grease will become quickly covered with winged and wingless moths over which the later-emerging moths will ascend the trees.

The factors making for natural bridges across the grease are :

- (i) soil splashed up when the bands are too near the ground ;
- (ii) falling leaves during October and November ; and
- (iii) the presence during late autumn of numerous insects for which the bands act as a fly-paper.

The numbers of insects which are sometimes caught on bands are so numerous that progress over their bodies is a comparatively simple matter for the wingless moths.

It may be of interest to note that the principal insects on the bands were :

Lepidoptera—

Winter moth, <i>Cheimatobia brumata</i>	.	.	22 October to 14 December.
Mottled Umber moth, <i>Hybernia defoliaria</i>	.	.	4 November to 6 January.
November moth, <i>Oporabia dilutata</i>	.	.	2 December.
March moth, <i>Anisopteryx aescularia</i>	.	.	29 February onwards.
Early moth, <i>Hybernia rupicapraria</i>	.	.	10 March.
Dotted Border moth, <i>H. progremmaria</i>	.	.	13 March.
Winter moth and Mottled Umber moths	.	.	several larvæ on the bands in mid-June.
Green Pug moth, <i>Eupithecia rectangularia</i>	.	.	numerous larvæ on the bands in May.

Diptera—

Crane flies, <i>Tipula</i> spp.	.	.	numerous on bands in October.
Winter gnats, <i>Trichocera</i> spp.	.	.	very numerous up to Christmas.
Moth flies, <i>Psychodidae</i>	.	.	numerous in autumn.
Mosquitos, <i>Culex</i> spp.	.	.	several on bands.
Midges, <i>Sciara</i> spp.	.	.	very numerous.
Anthomyiids	.	.	numerous every month.
Dung flies, <i>Scatophaga</i> spp.	.	.	numerous.
Muscids, e.g. Stable flies, <i>Stomoxys</i> ; Blow flies, <i>Calliphora</i> ; Greenbottles, <i>Lucilia</i>	.	.	particularly prevalent in autumn.

Coleoptera—

Carnivorous beetles, <i>Bembidion</i> spp.	.	.	quite common.
Leaf eating weevils, <i>Phyllobius</i> spp.	.	.	very numerous in May and June.

Rhynchota—

Froghoppers, <i>Philacnus spumarius</i>	.	.	a few adults in autumn.
Leafhoppers, <i>Jassidae</i>	.	.	very numerous in October.
Apple Sucker, <i>Psylla mali</i>	.	.	numerous adults in autumn.
Woolly Aphides, <i>Eriosoma lanigera</i>	.	.	very numerous in autumn and spring.

Thysanoptera—

Thrips, many species	.	.	very numerous.
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Orthoptera—

Earwigs, <i>Forficula auricularia</i>	.	.	numerous on and under bands
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Aptera—

Springtails, <i>Collembola</i>	.	.	very numerous.
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Arachnoidae—

Spiders, many species	.	.	numerous in autumn.
Mites, e.g. <i>Trombidium</i> , <i>Oribatidae</i>	.	.	several.

Myriapoda—

Millipedes, <i>Julus</i> spp.	.	.	several.
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Crustacea—

Woodlice, several spp.	.	.	numerous young.
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Blue Tits are very active during the latter months of the year in picking off the bodies of winter and other closely allied species of moth, preference being shown for the males on account of their freedom from grease, as they are usually caught by the wings, leaving the body free.

Many eggs are laid by the wingless moths before they die, but these do not hatch unless they are laid on the paper devoid of grease or on the trunk of the tree.

Judged on the requirements for a good banding grease, out of ten sent in for trial in the winter 1923-4, awards were given by the Council as follows :—

Award of Merit.

Bandite Tanglefoot, from Messrs. Strawson, 79 Queen Victoria St.
London, E.C. 4.

Moth Grip, from Messrs. W. Wood of Taplow.

Takitak, from Messrs. Craven of Evesham.

Highly Commended.

Orbite, from Messrs. Kay of St. Petersgate Mills, Stockport.

CURRENTS TRIED AT WISLEY.

TWENTY-TWO stocks were received for trial during the winter of 1919-20, representing fourteen varieties of Red Currants and six of Black Currants. The bushes were planted in February 1920, in land that had been previously well prepared, six feet apart each way, and shortly after planting they were pruned hard; the shoots on the Red Currants were shortened to about half or quarter their original length, according to vigour and position; whilst all the shoots on the Black Currants were cut down to within one or two inches of the soil level. Good growth was made by all during the summer. In the following year many of the Black Currants fruited well, and a sub-committee inspecting them on July 11, 1921, made the following recommendations for award:

HATTON BLACK, raised and introduced by Mr. H. Jones ...	...	...	A.M.
LONG BUNCH, raised and introduced by Mr. G. Trinder ...	...	...	H.C.

These awards were subsequently confirmed.

On July 13, 1922, a sub-committee again inspected the trial, and the following recommendations were made and subsequently confirmed:

RED Currants.

PERFECTION, raised and introduced by Messrs. Laxton	...	...	A.M.
COMET, from Messrs. Harraway and Laxton	...	...	H.C.
FOX'S NEW RED, from Messrs. Laxton	...	...	H.C.
HOUGHTON CASTLE, from Messrs. Harraway	...	...	C.
SOUTHWELL RED, introduced by Messrs. Merryweather	...	...	C.
BRIDGEFORD RED, introduced by Messrs. Merryweather	...	...	C.
LITTLECROFT BEAUTY, from Mr. Close	...	...	C.

The award to Littlecroft Beauty was for cropping qualities, but on the understanding that the variety is suitable for growing only in sheltered places.

BLACK Currants. "

HATTON GIANT, raised and introduced by Mr. H. Jones	H.C.
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WHITE Currants.

WHITE VERSAILLES, R.H.S.	A.M.
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Of the red-fruited varieties represented in the trial, only two had previously received an award, these being:

PERFECTION, A.M. 1916,	
COMET, A.M. 1896,	

whilst of the black-fruited varieties represented,

BOSKOOP GIANT, F.C.C. 1902,

was the only one that had previously received an award. It was on this occasion passed over as not of equal value to those varieties to which awards are now made. These past awards were not made

after trial in the Society's Gardens, but to specimens sent to the Fruit and Vegetable Committee.

During the winters of 1920-21 and 1921-22 other varieties have been added to the trial, and it is hoped that these will be ready for judging this summer. It will be convenient, therefore, to postpone a classification and full description of varieties until these may be included and comparisons made.

NOTES ON VARIETIES JUDGED.

RED-FRUITED VARIETIES.

NOTE.—Many varieties make long brittle shoots that are liable to be broken or twisted by wind. This was very evident in the trial, where the bushes are growing on a windy and exposed site. In less exposed positions it is likely that damage of this kind would be of no serious consequence.

BRIDGEFORD RED (Merryweather), C.—A strong grower, making sturdy upright bushes with long stout shoots. The dark red flowers, coppery red tinge of the young leaves and shoots, and later the stiff leathery bluish-green up-folded leaves, are conspicuous characters. A heavy cropper, the berries being large and brightly coloured in medium-size bunches. A little late in season. This variety was found by Messrs. Merryweather growing in the village of Bridgeford, and was introduced by them some thirty years ago. Bunyard* considers this synonymous with Gondouin, to his description of which it closely approximates.

CHERRY (Laxton).—Making medium-size bushes with long stout shoots that are sometimes broken or twisted by wind or the weight of the crop. The flowers are pale yellowish-green, flat, with a faint fleshy ring in the centre, whilst the leaves are large, thick, flat, and rather pale dull green. Has cropped moderately well, the berries being large and the bunches long. Mid-season.

COMET (Haraway, Laxton), H.C.—The two stocks of this variety have made but small, sparsely branched bushes, the shoots being rather short, stout and brittle. In high winds the shoots are often broken or twisted and it is not uncommon to find several "blind" † shoots. The flowers are pale, flat, with a distinct fleshy ring in the centre. In the early stages the leaves are light coloured but become dull green, flat, thick and often down-curled. For such small bushes very heavy crops have been borne, the large dark red berries hanging in long bunches. Rather early in season. Whether or not these stocks represent the original Comet, as raised by a Jersey amateur some forty-three years ago, we are yet unable to determine.

DEFIANCE (Laxton).—A strong grower, making large, much branched bushes with long stout shoots that are early in breaking into leaf in spring. The young leaves are noticeably light coloured; when mature rather pale green, thin and hairy beneath. The flowers are pale with a faint fleshy ring in the centre. A fairly heavy cropper, the berries being medium size, borne in moderately long bunches. Mid-season.

FAY'S PROLIFIC (Haraway).—Making fairly large bushes with long stout upright shoots that are a little late in breaking into leaf in spring; frequently the flowers are open before the leaves have appeared. Occasionally a few shoots are "blind." † The flowers are large, pale, with crimson blotches or stripes on the sepals. The young leaves are pale but later turn dull green, and are flat and rugose. Has cropped well, the berries being a good size, bright red, and the bunches moderately long. Early in season.

FOX'S NEW RED (Laxton), H.C.—Making rather small sparsely branched bushes with stout short shoots that are sometimes twisted or broken by wind; occasionally a few shoots are "blind." † The flowers are large, flat and pale with a distinct fleshy ring in the centre. The leaves are dull green, thick and often down-curled. Has cropped heavily, the berries large, borne in long bunches. Season, early. The senders obtained this stock from America.

* BUNYARD, E. A., "A Revision of Red Currants," *Gard. Chron.*, vol. Ixii. Nos. 1613-1616.

† Blind shoots refer to those upon which the buds fail to develop. When pruning varieties addicted to this habit, care must be taken that the cut is made to a healthy and well formed bud, particularly when shaping young bushes.

HOUGHTON CASTLE (*Harraway*). C.—A very strong grower, making large upright-spreading, much branched bushes, with long upright and moderately stout shoots. The urn-shaped flowers are faintly blotched crimson and the flower stalks are noticeably hairy. In the early stages the leaves are very pale, later turning to a light bright green, thin and densely hairy beneath. A very heavy cropper, the berries being of medium size, dark red, and the bunches moderately long. Mid-season. This variety is sometimes known as Victoria.

LITTLECROFT BEAUTY (*Closs*). C.—Making medium-size bushes with long stout brittle shoots that are often broken by wind or the weight of the crop. The flowers are pale in colour and the leaves large, thick, and dull milk-green in colour. The bushes have cropped very heavily, the berries being large and the bunches long. Mid-season. This variety was received for trial in 1916, but on previous occasions the judges have not considered it worthy of recognition owing to the pronounced brittleness of the shoots, resulting in very many being broken by wind. It has cropped so remarkably well, however, and the berries are of such good size and colour that the committee desired that it should be commended as a variety to grow in sheltered parts of the garden, or as cordons with adequate supports.

→ **NORTH STAR** (*Laxton*).—A fairly vigorous grower making large upright-spreading bushes. The long stout shoots are sometimes broken or twisted by wind and occasionally a few are "blind." * The flowers are large and pale coloured, with a faint fleshy ring in the centre, whilst the leaves are dark green, flat, and sometimes up-curved. Has cropped moderately well, the berries and bunches being of medium size. Mid-season. The senders obtained this stock from America.

PERFECTION (*Laxton*). A.M.—Making medium-size, sparsely branched bushes with stout, long brittle shoots that are sometimes broken or twisted by winds or the weight of the crop; not infrequently a few shoots are "blind." * The flowers are large, flat, and pale-green, with occasional red blotches on the sepals, and a faint fleshy ring in the centre. In the young stage the leaves are tinged coppery red, but later become a pale milk-green, rugose and flat or down-curved, giving a rounded appearance to the leaves. The bushes have cropped remarkably well, the berries being very large and brightly coloured and the bunches very long. It is a mid-season variety, but the berries will hang and keep their bright colour until late. This is quite the heaviest cropper and largest berried variety in the trials. Raised and introduced by Messrs. Laxton.

RABY CASTLE (*Harraway, Laxton*).—Fairly vigorous, making medium-size upright bushes with long stout upright shoots. The flowers, which are sometimes open before the young leaves appear, are pale with faint crimson blotches on the sepals. In the early stages the leaves have a coppery tinge, but later become a dull milk-green, soft, and with a very hairy under-surface. The bushes have cropped well, the medium-size berries being a very bright red and the bunches are moderately long. A little late in season.

RED DUTCH (*Laxton*).—Vigorous, making large upright-spreading bushes with long moderately stout shoots. The flowers are pale with sepals faintly blotched crimson. The young leaves have a brownish tinge, later becoming rather pale green, large, thick and a little up-curved. This variety cropped well, the berries being of medium size, brightly coloured and the bunches fairly long. Mid-season or a little later.

RED VERSAILLES (*Laxton*).—Making rather small sparsely branched bushes with short stout shoots that are frequently broken or twisted by wind. The flowers are markedly greenish, flat, with a distinct fleshy ring in the centre, whilst the leaves are large, thick, pale and flat or down-curved. Has cropped moderately well, the berries being large and the bunches long. Mid-season.

SOUTHWELL RED (*Merryweather*). C.—Of medium vigour, making compact bushes with moderately long stout shoots that are a little late in breaking into leaf. The flowers, which are blotched crimson, are late in opening, and the dark bluish-green leaves are usually up-folded. Berries of medium size, dark red, in somewhat short bunches. Rather late. Fairly good crops have been borne each year. Introduced by Messrs. Merryweather.

WILDER (*Laxton*).—Making medium-size, sparsely branched bushes with stout shoots that are often "blind," * and are often broken in high wind. The shoots are markedly early in breaking into leaf. The pale greenish-yellow flowers have a faint fleshy ring in the centre, whilst the leaves are flat, fairly

* Blind shoots refer to those upon which the buds fail to develop. When pruning varieties addicted to this habit, care must be taken that the cut is made to a healthy and well-formed bud, particularly when shaping young bushes.

thick, and a dull, pale green. Good cropper, the berries being large and the bunches long. Mid-season, or a little early. The senders obtained this stock from America.

WHITE-FRUITED VARIETIES.

WHITE VERSAILLES (R.H.S.), A.M.—Vigorous, making large upright-spreading bushes with long strong shoots. Has cropped very heavily, the berries being large, very good flavour, and borne in long bunches. This variety has been growing in the trial grounds for several years and has, so far, proved the best of the white-fruited varieties in the collection. Others will be described subsequently.

BLACK-FRUITED VARIETIES.

*NOTE.—All the stocks have been more or less severely attacked by the Big bud or Gall mite (*Eriophyes ribis*), and "Reversion" or "Nettleleaf" has made an appearance among the stock during the last season or so. Both have appreciably reduced the cropping of the bushes, but the recommendations were mostly made before interference from these sources was evident.*

BLACKSMITH (Laxton).—Of moderate vigour, making medium-size compact bushes with long slender shoots. The small buds are greenish-white with a slight reddish tinge and are somewhat late in breaking into leaf. Has cropped moderately well, the berries being medium size and the bunches long. Rather late in season. Raised and introduced by Messrs. Laxton.

BOSKOOP GIANT (Harraway).—Making large spreading bushes with stout shoots and pink buds. Has cropped moderately well, the berries being very large in long bunches. Early. Introduced by Messrs. Bunyard in 1895—raised in Holland.

HATTON BLACK (Jones), A.M.—Vigorous, making large upright-spreading bushes, with strong stout shoots and large greenish white buds. Has cropped heavily, the berries being large in rather short bunches; mostly two or more bunches to a spur. Early. Raised and introduced by Mr. H. Jones, who records it as a seedling from Boskoop Giant, probably crossed with Carter's Champion.

HATTON GIANT (Jones), H.C.—Vigorous, making large bushes with long stout shoots and greenish-white buds. Has cropped well, the berries being large in rather short bunches; usually two or more bunches to a spur. Rather early. Raised and introduced by Mr. H. Jones, who records it as a seedling from Boskoop Giant, probably crossed with Carter's Champion.

LONG BUNCH (Trinder), H.C.—Very vigorous, making much branched, upright-spreading bushes with long shoots. The buds, which are greenish-white with a reddish tinge, are a little late in breaking into leaf. Has cropped well, the berries being of medium size, borne in long bunches; usually one bunch to a spur. Mid-season. Raised and introduced by Mr. G. Trinder.

TINKER (Laxton).—Making medium-size bushes with slender shoots and slightly pinkish buds. Has cropped moderately well, the berries being medium size in long bunches; usually one bunch to a spur. A little late. Raised and introduced by Messrs. Laxton.

BRUSSELS SPROUTS AT WISLEY, 1923.

NINETY-FIVE stocks of Brussels Sprouts were sent for trial in 1923. The seed was sown on March 19 in drills 6 feet apart. One row of each stock was transplanted between the sown rows, making the rows 3 feet apart, the same distance being allowed between plants. It is to be noted that the transplanted plants reached maturity at the same time as those allowed to remain where the seed was sown. The transplanting was done on May 25. The ground had been occupied in 1922 by late peas; it was flat dug in the autumn of 1922, but no manure was given; in the spring of 1923 the ground was deeply forked so as to distribute the manure from the pea trenches equally over the ground, after which it was well firmed. So treated, practically all the varieties produced firm sprouts, whether of large or small size.

Nos. 32 and 68 failed to germinate, and No. 85 was a very mixed stock; no further mention is made of these.

The Fruit and Vegetable Committee examined the trial on several occasions during growth, and made their recommendations for Awards on October 31.

The following variety which had previously received an Award was represented in the trial, but was passed over on this occasion:

No. 84. Dundee [A.M. 1918 (Barr)].

AWARDS, NOTES, AND DESCRIPTIONS.

A. DWARF VARIETIES (UP TO 2 FEET).

AWARDS.

18. **Solidity**, A.M. October 31, 1923. Raised and sent by Messrs. Wheelers of Warminster.

37. **One and All**, A.M. October 31, 1923. Raised and sent by Messrs. Heinemann of Erfurt, Germany.

14. **Half Long Paris**, H.C. October 31, 1923. Sent by Messrs. Toogood of Southampton.

12. **Standard (Sharpe's)**, H.C. October 31, 1923. Sent by Messrs. Barr of Covent Garden, W.C.

1. **Dwarf Selected**, C. October 31, 1923. Raised and sent by Messrs. Zwaan & de Wiljes of Scheemda, Holland.

4. **Ideal**, C. October 31, 1923. Raised by Mr. G. Taylor and sent by Messrs. Dickson, Brown & Tait of Manchester.

29. **Selected**, C. October 31, 1923. Raised and sent by Messrs. G. Cooper of Bedford.

66. **Early Giant**, C. October 31, 1923. Raised and sent by Messrs. Clucas of Ormskirk, Lancs.

30. **Selected**, C. October 31, 1923. Raised and sent by Messrs. G. Cooper.

I. SPROUTS SMALL.

1. **DWARF SELECTED** (Zwaan & de Wiljes), C.—18 inches; leaves incurved; sprouts tightly placed. Stood very well. Early.

18. **SOLIDITY** (Wheelers), A.M.—Much like No. 1, but leaves less incurved, and slightly smaller sprouts. A very good stock.

19. **SOLIDITY** (Barr).—A mixed stock of No. 18.

3. **DWARF GEM** (Barr).—Described vol. 45, p. 127. A mixed stock.

2. **LITTLE GEM** (Barr).—Described vol. 45, p. 127.

4. **IDEAL** (Dickson, Brown & Tait), C.—Described vol. 45, p. 127. A regular stock. Stood very well. Early.

6. **WESTLAND** (Zwaan & de Wiljes).—18-21 inches; leaves of medium size; sprouts closely placed. Stood well. Early. Raised by sender.

14. **HALF LONG PARIS** (Toogood), H.C.—18-24 inches; leaves slightly incurved; sprouts very solid. Stood well. Late.

11. **DELICATESSE** (Barr).—Described vol. 45, p. 126. Stood well. Early.

62, 63. **PERFECTION** (Garden Supplies, Carter).—18-24 inches; leaves large, dark green; sprouts solid, closely placed, soon burst. Late. Stocks not quite true.

37. **ONE AND ALL** (Heinemann), A.M.—18-24 inches; foliage of medium size, incurved; sprouts very solid, closely placed. Stood very long. Early. A very good stock.

2. Sprouts small to medium.

80. **SELECTED** (W. G. Holmes).—An irregular stock.

79. **MACGREGORS GATHERING** (Stuart & Mein).—18 inches; foliage of medium size, dark bluish-green; sprouts solid. Stood fairly well. Late.

64. **SANDY PRIZE** (Unwin).—Slightly dwarfer and paler foliage than No. 79, and sprouts soon burst. Late.

94. **SPRAL** (Barr).—21 inches; foliage of medium size, dark green, incurved; sprouts solid. Early. Heads damaged by frost.

56. **XXX No. 3214** (Harrison).—2 feet; foliage large; sprouts very solid, closely placed, soon burst. Late.

57. **XXX No. 3176** (Harrison).—A somewhat mixed stock of No. 56, but sprouts stood longer.

31. **EXPRESS** (Finney).—2 feet; foliage of medium size, medium dark green sprouts solid. Stood well. Late.

3. Sprouts of medium size.

38. **COLOSSAL** (Wheeler).—18 inches; foliage of medium size, dark green sprouts solid. Stood very well. Early. One rogue, otherwise a good stock.

39. **COLOSSAL** (Barr).—Taller than No. 38, and a variable stock.

29. **SELECTED** (G. Cooper), C.—2 feet; foliage large, dark green; sprouts very solid, closely placed. Early. Stood very well. A good stock.

4. Sprouts medium to large.

66. **EARLY GIANT** (Clucas), C.—18-24 inches; foliage of medium size, medium green; sprouts very solid. Stood well. Early.

35. **FILLBASKET** (Barr).—An irregular stock.

23. **CHAMPION** (Richardson).—18-21 inches; foliage of medium size, pale green; sprouts solid. Stood well. Late.

5. Sprouts large.

30. **SELECTED** (G. Cooper), C.—A paler selection of No. 29, but with larger sprouts.

12. **STANDARD** (SHARPE'S) (Barr), H.C.—2 feet; foliage large, very dark green; sprouts very solid. Stood well. Crop good. Mid-season.

13. **STANDARD** (Barr).—A poor stock of No. 12.

B. TALL VARIETIES (OVER 24 INCHES)

AWARDS.

43. **Darlington, A.M.** October 31, 1923. Raised by Messrs. Kent & Brydon and sent by Messrs. Nutting of Southwark St., London.

17. **Walton Dwarf No. 12**, H.C. October 31, 1923. Raised by Mr. A. Toft

26. **Walton Dwarf No. 2**, and sent by Messrs. Rowlands of Liverpool.

7. **Early Tall Improved**, C. October 31, 1923. Raised and sent by Messrs. Zwaan & de Wiljes of Scheemda, Holland.

15. **Walton Dwarf No. 8**, C. October 31, 1923. Raised by Mr. A. Toft and sent by Messrs. Rowlands.

33. **Masterpiece**, C. October 31, 1923. Raised by Mr. Masters and sent by Messrs. Harvey of Kidderminster.

i. Sprouts small.

88. ROSNY (Barr).—Described vol. 45, p. 126. Late.
 89. TALL FRENCH (Barr).—Described vol. 45, p. 126. Late.
 81. IMPROVED (Laxton).—21–27 inches; foliage of medium size, dark green sprouts variable in size, solid. Stood fairly well. Late. Raised by sender.
 82. DEFIANCE (Barr).—21–27 inches; foliage large, medium green, variable; sprouts solid; crop poor. Mid-season.
 77. PROLIFIC EXHIBITION (Kelway).—24–30 inches; foliage large, dark green, incurved; sprouts solid, flattish; crop good. Early.
 78. HOLBORN EXHIBITION (Carter).—Very much like No. 77, but sprouts larger, and foliage not incurved. Raised by sender.
 71. TIMPERLEY WONDER (Dicks).—Much like No. 78 but sprouts less solid and on the whole smaller. Late. Raised by sender.
 87. OFFENHAM (Barr).—Described vol. 45, p. 127. Late.
 24, 25. KING OF THE MARKET (Barr, Nutting).—Described vol. 45, p. 127. Did not stand well. Late. No. 24 somewhat mixed stock.

3. Sprouts small to medium.

3. Sprouts of medium size.

33. MASTERPIECE (Harvey).—C.—24-30 inches; foliage of medium size, medium green; sprouts solid, closely placed. Stood well. Early.

4. *Sprouts medium to large.*

17. WALTON DWARF No. 12 (Rowlands), H.C.—24-30 inches; foliage large, pale green; sprouts solid, closely placed. Stood well. Early. A good type, but needs a little further selection.

26. WALTON DWARF No. 2 (Rowlands), H.C.—Similar to No. 17.

15. WALTON DWARF No. 8 (Rowlands), C.—Not quite so good a stock as No. 17.

16. WALTON DWARF No. 9 (Rowlands).—A further selection of No. 17.

48. COVENT GARDEN (WHEELERS).—Described vol. 45, p. 126. Late.

36. FILLBASKET (Dicks).—30 inches; foliage of medium size, dark green; sprouts solid, closely placed. Stood well. Early. Raised by sender.

10. COVENT GARDEN FAVOURITE (Barr).—30 inches; foliage large, pale green; sprouts solid, closely placed; heads damaged by frost. Stock not quite true. Late.

5. *Sprouts large.*

27. CAMBRIDGE CHAMPION (Bath) { Described vol. 45, p. 126. Late.
28. CAMBRIDGESHIRE CHAMPION (Barr) { Stocks not quite true. Stood
well.

7. EARLY TALL IMPROVED (Zwaan & de Wiljes), C.—24-27 inches; foliage of medium size, dark green, incurved; sprouts solid; heads slightly damaged by frost. Stood very well. Early.

40. BORRIS (Wibolt).—Much like No. 7, but foliage pale green. Plants variable in cropping. Early. Raised by sender.

20-22. HERCULES (Hancock, Barr, Garden Supplies).—Described vol. 45, p. 127. Stocks very irregular. Raised by Messrs. Hancock.

89. FAVOURITE (Dobbie, Barr).—30 inches; foliage large, pale green; sprouts rather loose. Stood very well. Early. No. 9 a poor stock.

5. IDEAL (A. Dickson).—Of No. 8 type, but an irregular stock; heads damaged by frost. Stood very well. Early.

CARROTS IN FRAMES AT WISLEY, 1922-23.

FORTY-SIX stocks of Carrot were sent for trial in 1922. The trial was grown in a heated frame. A mild hotbed of leaves and long stable manure was used to fill the frame; on top of this was placed about 4 inches of sifted old potting soil. The seed was sown on December 8, in drills 4 inches apart. As soon as the seedlings were large enough to be handled they were thinned to 1 inch apart, a later thinning being done, leaving the plants 2 inches apart in the rows. The temperature was 55-60° during the day and 50-55° at night, but slightly lower during the months of December and January. During early April the lights were removed during the day, and towards the end of the month they were altogether removed.

The Fruit and Vegetable Committee made their recommendations for awards on May 15.

AWARDS, DESCRIPTIONS, AND NOTES.

I. ROOTS RED.

AWARDS.

Early Frame, A.M. May 15, 1923. Sent by Messrs. Barr of King St., Covent Garden, London, W.C.

Early Parisian Forcing, A.M. May 15, 1923. Sent by Messrs. Barr.

Amsterdam Forcing, A.M. May 15, 1923. Sent by Messrs. Zwaan & de Wiljes of Scheemda, Holland, and by Messrs. G. van der Veld of Lisse, Holland.

Long Forcing, A.M. May 15, 1923. Sent by Messrs. J. Carter of Raynes Park, London, S.W.

Guérande, H.C. May 15, 1923. Raised by Messrs. Vilmorin-Andrieux and sent by Messrs. R. Veitch of Exeter.

Early Horn Improved, H.C. May 15, 1923. Sent by Messrs. J. Carter.

Primo, H.C. May 15, 1923. Introduced and sent by Messrs. Watkins & Simpson of Drury Lane, Covent Garden, London, W.C.; also sent by Messrs. Barr.

A. ROOTS ALMOST ROUND.

1. *Foliage small.*

EARLY PARISIAN FORCING (Barr), **A.M.**—A very good stock. Ready May 4.

GOLDEN BALL (Carter).—Irregular in shape. Ready May 10.

FRENCH FORCING HORN (Kelway, Hurst, Watkins & Simpson, R. Veitch). The first stock was variable in shape. Ready May 10.

EARLIEST FRENCH SHORT HORN (Barr).—Ready May 10.

EARLY FRAME (Barr), **A.M.**—Ready May 6.

EARLY FRAME (Watkins & Simpson).—Ready May 12.

2. *Foliage larger.*

EARLY GEM (Barr, Kelway).—Ready May 10.

B. ROOTS RATHER LONGER THAN WIDE.

1. *Foliage small.*

EARLY QUEEN (Barr).—Variable in shape. Ready May 10.

EARLY BUNCHING (Harrison).—Ready May 10.

2. *Foliage medium.*

EARLY SHORT HORN (Barr).—Ready May 10.
EARLY HORN (Dobbie).—Ready May 10.

3. *Foliage large.*

GUERANDE (R. Veitch), **H.C.**.—Ready May 6.
GUERANDE (Hurst).—Contained white rogues. Ready May 10.
DEMI COURTE AMÉLIORÉE À COUCHES (Watkins & Simpson).—Ready
May 12.
VERY SHORT STUMP-ROOTED DUWICK (Barr).—Ready May 10.
SCARLET PERFECTION (Dobbie).—Ready May 10.

C. ROOTS CYLINDRICAL (STUMP).

1. *Foliage small, sparse.*

The earliest carrot to be ready for use.

AMSTERDAM FORCING (Zwaan & de Wiljes, van der Veld), **A.M.**.—Little core. Ready May 1. Suitable for frame culture.
AMSTERDAM FORCING (Barr).—A variable stock with larger top. Ready May 6.
LONG FORCING (Carter), **A.M.**.—Like 'Amsterdam Forcing.' Ready May 1.

2. *Foliage of medium size.*

EARLY HORN IMPROVED (Carter), **H.C.**.—Ready May 6.
FRANKFORT FORCING (Barr).—Variable in shape. Ready May 10.
CARENTAN HALF-LONG FRAME (Barr).—Several plants bolted. Ready May 12.
STUMP-ROOTED SELECTED (Dobbie).—Ready May 10. A good stock.
PRIMO (Watkins & Simpson, Barr), **H.C.**.—Ready May 6.

3. *Foliage large.*

SCARLET MODEL (R. Veitch).—Contained roundish rogues. Ready May 10.
EARLY MARKET (Harrison, Barr).—The latter variable in shape. Ready May 10.
EARLY SCARLET HORN (Carter).—Ready May 10.
CHAMPION SCARLET HORN (Hurst).—Ready May 10.
LINCOLN GEM (Sharpe).—Ready May 12.

D. ROOTS CYLINDRICAL (STUMP), LONGER THAN C.

1. *Foliage medium.*

EARLY NANTES HORN (R. Veitch).—Variable in shape. Ready May 10.
EARLY NANTES (Hurst, Kelway).—Ready May 10.
NANTES EARLY STUMP-ROOTED (Dobbie).—Little core. Ready May 10.
PARAGON (R. Veitch).—Ready May 10.

E. ROOTS INTERMEDIATE IN LENGTH, TAPERING.

NEW INTERMEDIATE (R. Veitch).—Ready May 10.
INTERMEDIATE IMPROVED (Kelway).—Contained pale rogues. Ready May 15.
JAMES' INTERMEDIATE (Kelway).—Ready May 18.
JAMES' SCARLET INTERMEDIATE (R. Veitch).—Ready May 18.

F. ROOTS LONG AND TAPERING.

ALTRINCHAM (R. Veitch).—Ready May 15.

KALES AT WISLEY, 1923-24.

SIXTY-THREE stocks of Kales were sent for trial in the spring of 1923. These were grown on ground which had carried a previous crop of Leeks; it was forked, but no manure was added. Two sowings were made: one half of the plot was sown on April 9, and these were transplanted into their permanent quarters on June 18; the second sowing took place on May 7, transplanting being done on July 2, the sown row in each case being thinned out; thus each stock was treated in a similar manner. The rows were 2 feet 6 inches apart, the plants the same distance in the rows. So treated, almost all made good growth in spite of the unfavourable winter, especially during November and December.

Notice is drawn to the effects of frost, especially during the month of November, on the different varieties, and notes due to it appear after each variety in the report.

Two stocks, Nos. 53, 55, purported to be of the "Drumhead" type, but these when grown were of the "Scotch" type; no further mention of these is made in the report.

The trial was judged on February 28 by the Fruit and Vegetable Committee, who made their recommendations for awards.

The following varieties, which had gained awards in previous years, were represented in the trial, but these were passed over this year by the Judging Committee, viz.:

58. Ormskirk Hearting [A.M. (Clucas) 1919]; 59, 60. Chou de Russie [F.C.C. (Carter) 1902]; 62. Variegated [A.M. (Veitch) 1889].

AWARDS, NOTES, AND DESCRIPTIONS.

I.—Non-Hearting Varieties.

A. FOLIAGE GREEN.

I. MARGINS CRESTED.

(a) Dwarf (up to 15 inches).

25. DWARF EXTRA FINE CURLED (Zwaan & de Wiljes) 8-12 inches; habit compact; foliage dark green. Suitable

27. DWARF CURLLED (W. H. Simpson) } for planting 18 inches apart.

34. EXHIBITION (Stuart & Mein).—12-15 inches; foliage shorter and more heavily crested than foregoing.

(b) Intermediate (over 15 inches and less than 24 inches).

AWARDS.

24. NEW WINTER, A.M. February 28, 1924. Raised and sent by Messrs. Dickson & Robinson of Manchester.

35. WESTLAND, H.C. February 28, 1924. Raised and sent by Messrs. Zwaan & de Wiljes of Scheemda, Holland.

38. MOSS CURLLED EXHIBITION, C. February 28, 1924. Sent by Messrs. Barr of Covent Garden, London, W.C. 2.

24. NEW WINTER (Dickson & Robinson), A.M.—18 inches; forming large compact heads; foliage very large, broad, medium dull green. Sprouting late. A very even stock. Not damaged by frost.

16. A.I. (Barr).—18-24 inches; foliage dark green; habit compact. More crested than most of this type. Not damaged by frost.

35. WESTLAND (Zwaan & de Wiljes), H.C.—20-24 inches; foliage of medium size, heavily crested. Sprouting freely. Very good crop. Not damaged by frost.

42-44. VICTORIA (Barr, Dobbie, R. Veitch).—18-24 inches; heads compact; foliage of medium size, midrib narrow. Slightly damaged by frost. No. 43 was a very good stock. No. 44 was very mixed.

38. MOSS-CURLED EXHIBITION (Barr), C.—16-20 inches; foliage dark bright green. A good stock. Not damaged by frost.

17. SCOTCH (W. G. Holmes) } Much like A.I. but dwarfer and

18. SCOTCH SELECTED (Barr) } paler green. No. 18 not quite

20. HALF DWARF CURLED SCOTCH (Cooper-Taber). } true. Slightly damaged by frost.

26. DWARF CURLED (Toogood).—A mixed stock of "Scotch" type.

36. DWARF GREEN MOSS-CURLED (Barr).—An irregular stock of No. 17 type.

(c) Tall (over 2 feet).

AWARDS.

{ 31. **Tall Curled, H.C.** February 28, 1924. Sent by Messrs. Toogood of Southampton.

{ 33. **Tall Green Curled, H.C.** February 28, 1924. Sent by Messrs. Nutting of Southwark Street, London.

41. **Northern Plume, H.C.** February 28, 1924. Raised by Mr. Jackson and sent by Messrs. D. T. Brown of Poulton-le-Fylde, Lancs.

1. Leaves long, broad.

31. **TALL CURLED** (Toogood) { **H.C.**—2-2½ feet; foliage large, dark

33. **TALL GREEN CURLED** (Nutting) { bright green. Sprouting freely. Not damaged by frost.

32. **TALL GREEN CURLED** (Carter).—Similar to No. 31, but contained rogues.

29. **SEMI-DWARF GREEN CURLED** (Nutting).—Similar to No. 31, but taller.

19. **TALL SCOTCH** (Barr).—Characters as for No. 31.

21. **TALL CURLED SCOTCH** (Cooper-Taber).—Characters as for No. 31.

2. Leaves shorter.

40. **SPONGE** (Kelway).—2-3 feet; habit erect and compact; foliage of medium length, broad, dark bright green. Damaged by frost.

37. **HALF DWARF MOSS-CURLED** (Zwaan & de Wiljes).—Characters as for No. 40.

28. **DWARF GREEN MOSS-CURLED** (Carter).—Of No. 40 type. Damaged by frost.

30. **TALL CURLED** (W. H. Simpson).—Foliage coarser crested than No. 40, but otherwise similar. Damaged by frost.

3. Leaves long, narrow.

41. **NORTHERN PLUME** (D. T. Brown), H.C.—18-24 inches; foliage dark dull greyish-green, heavily crested. Sprouting freely. Not damaged by frost.

22. **LARK'S TONGUE** (Zwaan & de Wiljes) } Less regular stocks of
39. **LANGPORT CRESTED OR FROSTPROOF** (Kelway) } No. 41.

2. MARGINS PLAIN.

AWARD.

2. **Cottagers, A.M.** February 28, 1924. Sent by Messrs. W. H. Simpson of Birmingham.

(a) 'Asparagus' type.

1. **LIMPSFIELD GREENS** (H. Roberts).—8-10 inches; foliage small, smooth, medium green. Sprouting from ground level. Slightly damaged by frost.

5. **NEW SPROUTING** (Barr).—Of No. 1 type, but foliage broadly curled. Damaged by frost.

'Asparagus,' 'Buda,' 'Buda Purple,' 'New Labrador,' 'Jerusalem' were sent, but these were much damaged by frost in November and did not recover.

(b) 'Cottagers' type.

2. COTTAGERS (W. H. Simpson), A.M.—2-2½ feet; very vigorous; foliage large, crumpled, dark dull green, more or less tinged purple. Sprouting freely. Suitable for small gardens. Not damaged by frost.

3, 4. COTTAGERS (R. Veitch, Barr).—Characters as for No. 2, but less regular stocks.

(c) 'Jersey' type.

63. JERSEY (Barr).—2½-3½ feet; foliage very large, broad, entire, pale green, crimped. Much damaged by frost.

(d) Foliage deeply cut.

45. RAGGED JACK (Barr).—18 inches; foliage large, irregularly cut, dark green; stem short. Sprouting freely. Slightly damaged by frost.

B. FOLIAGE PURPLE.

I. MARGINS CRESTED.

(a) Dwarf (up to 15 inches).

13. DWARF PURPLE CURLED (Barr).—12-14 inches; a very good stock. Not damaged by frost.

(b) Tall (over 2 feet).

15. TALL PURPLE (Carter).—The tall counterpart of 'Dwarf Purple Curled.' A good stock. Not damaged by frost.

C. FOLIAGE VARIEGATED.

23. SILVERHEART (Zwaan & de Wiljes).—2-2½ feet; foliage large, margins crested, medium dull green; head leaves variegated with white. Raised by sender.

61. ALBINO (Barr).—18-24 inches; foliage large, deeply cut, dark green, variegated with white. Damaged by frost. A variable stock.

62. VARIEGATED (Barr).—18-24 inches; foliage of medium size, margins crested; bright reddish-purple. Damaged by frost.

II.—Hearting Varieties.

A. FOLIAGE GREEN.

I. MARGINS CRESTED.

46. NEW DRUMHEAD (Barr).—11 inches; foliage large, medium green, midrib broad, ivory-white. Damaged by frost. Stock not quite true.

47-52. DRUMHEAD (Kelway, W. H. Simpson, Toogood, R. Veitch, Carter, Nutting).—Characters as for No. 46. Nos. 47-51 not quite true.

56. WALTON DWARF (Rowlands).—Of No. 46 type, but foliage a shade darker. Raised by Mr. A. Toft and introduced by sender.

54. HEARTING IMPROVED (Harrison).—Of No. 46 type and characters as for No. 56, but margins more crested.

58. ORMSKIRK HEARTING (Clucas).—Characters as for No. 56. Raised by sender.

2. FOLIAGE DEEPLY CUT.

59, 60. RUSSIAN or CHOU DE RUSSIE (Carter, Barr).—18 inches; heads loose; foliage dark greyish-green, inner paler; stem large and thick. Not damaged by frost.

3. FOLIAGE PLAIN.

57. HYBRID (A. Dickson).—12 inches; heads pointed, firm; foliage very dark green, inner yellowish. Damaged by frost. Raised by sender.

WINTER LETTUCES AT WISLEY, 1922-23.

ONE hundred and twenty stocks of Lettuce seeds were received at Wisley for trial, consisting of seventy-six names. They were sown on September 5, 1922, one row being transplanted on September 29, 1922, on ground in an open situation which had had a previous crop of Broad Beans, and which had afterwards been dug and moderate dressing of pig manure applied. The rows were 15 inches apart, and 12 inches between plants. A few plants died, and their places were filled on October 31, after which no further planting was done. The winter was not severe, though the rainfall was 1.79 inch above the normal for the months September 1922 to May 1923 inclusive. A note will be found following each name in the "Notes and Descriptions," showing the proportion of failures.

A sub-committee of the Fruit and Vegetable Committee examined the growing crops on several occasions and recommended awards to the best stocks.

It is of considerable interest to note the behaviour of the different stocks in this and the previous trial of winter Lettuces, for the dependability of the varieties in very different seasons is brought out. The season of 1922-23 was of the open, wet type, while that of 1917-18 was severe. It will be seen that the varieties singled out for special mention in the one trial are almost identical with those in the other.

Particular attention may be drawn to the difference in earliness of many of the Cabbage varieties compared with the Cos. Some of the former were ready by the end of April, the earliest of the latter not until mid-May, while the variety 'Black-seeded Bath Cos,' such a favourite for autumn sowing, was not fit to cut until June 8.

As will be seen, crisp Cabbage Lettuces can be selected, by those who do not care for the buttery texture of most varieties of that type, as early as the buttery forms; and in fact the Cabbage types afford varieties for all tastes, stand better through dry seasons if care is taken in selecting varieties, and require no tying, while they are equally good cooked.

In the following notes we have followed the classification adopted in reporting the trial of 1919 (see R.H.S. JOURNAL, vol. 45, pp. 334, 354).

CABBAGE HEARTING LETTUCE.

I. CRISP HEARTING.

(a) Seeds white.

AWARD.

7. **Hercules, H.C.** May 3, 1923. Sent by Messrs. Dobbie of Edinburgh.

1. Foliage medium green, margins red.

2. **ROYAL ALBERT** (R. Veitch).—See JOURNAL, vol. 45, p. 342. Stock not quite true. Ready May 1.

3. **ICEBERG** (Burpee).—See JOURNAL, vol. 45, p. 342. 7 per cent. failed. Ready May 1.

2. Foliage dark dull green, margins pale.

7. HERCULES (Dobbie), **H.C.**—See JOURNAL, vol. 45, p. 342. The best stock of 'New York' type suitable for private garden use. 9 per cent. failed. Ready May 1.

4. WONDERFUL (Dobbie).—See JOURNAL, vol. 45, p. 342. 6 per cent. failed. Varies somewhat. Ready May 1.

5. NEAPOLITAN (Dobbie).—See JOURNAL, vol. 45, p. 342. 3 per cent. failed. Varies somewhat. Ready May 1.

6. DUKE OF CORNWALL (R. Veitch).—See JOURNAL, vol. 45, p. 342. Variable in size. Ready May 1.

3. Foliage medium dull green, scarcely blistered.

8. BRITTLE ICE (Burpee).—See JOURNAL, vol. 45, p. 342. 11 per cent. failed. Ready May 28.

II. SMOOTH HEARTING, OF BUTTERY TEXTURE.

(a) Seeds white.

AWARDS.

- 11. **Winter Giant, F.C.C.** May 3, 1923. Raised and sent by Messrs. R. Veitch of Exeter.
- 18. **Stanstead Park, F.C.C.** May 3, 1923. Raised by Messrs. Downie, Laird & Laing and sent by Messrs. Nutting of Southwark St., S.E. (**A.M.** Nutting, 1918).
- { 48, 50. **HammerSmith Hardy Green, A.M.** May 3, 1923. Sent by Messrs. Cullen of Marks Tey, and Watkins & Simpson of Feltham.
- 52. **Hardy HammerSmith, A.M.** May 3, 1923. Sent by Messrs. Dobbie of Edinburgh.
- 28. **Grand Admiral, H.C.** May 3, 1923. Raised and sent by Messrs. R. Veitch.
- 67. **Winter Brown, H.C.** May 3, 1923. Sent by Messrs. Barr of Covent Garden, W.C.
- 63. **Schofield's Hardy Winter, H.C.** May 3, 1923. Sent by Messrs. Barr.
- 24, 25, 26. **Trocadero, C.** May 3, 1923. Sent by Messrs. Watkins & Simpson, Barr and R. Veitch.

1. Foliage medium green tinged more or less red.

(a) Medium size.

12. **EARLY PARIS MARKET** (Nutting).—See JOURNAL, vol. 45, p. 344. Stock not quite true. 11 per cent. failed. Ready May 7.

13-15. **MAY KING** (Harrison, Watkins & Simpson, Barr) } ---See JOURNAL, vol. 45, p. 344. 7 per cent. failed. Ready May 3.

* * *

17. **MADEIRA GIANT** (Barr).—See JOURNAL, vol. 45, p. 356. A mixed stock.

* * *

19, 20-23. **STANSTEAD PARK** (Cullen, Kelway, Watkins & Simpson, Cooper-Taber, Toogood).—A smaller form of No. 18, otherwise similar. No. 23 not true stock.

24. **WINTER PASSION WHITE** (Nutting).—Similar to 'Stanstead Park.' A misnomer.

(b) Medium large.

18. **STANSTEAD PARK** (Nutting) } , **F.C.C.**—See JOURNAL, vol. 45, p. 356.

11. **WINTER GIANT** (R. Veitch) } . A large form of this variety. Suitable for private garden or market use. All survived. Excellent stocks. Ready April 30. This stock of 'Stanstead Park' (best in 1917-18) is considerably larger than those already referred to.

* * *

24-26. **TROCADERO** (Watkins & Simpson, Barr, R. Veitch), **C.**—See JOURNAL, vol. 45, p. 344. 5 per cent. failed. Ready April 30. Suitable for garden use.

27. **IDEAL** (R. Veitch).—Similar to 'Trocadero.' See JOURNAL, vol. 45, p. 344. 11 per cent. failed. Ready May 1.

* * *

28. **GRAND ADMIRAL** (R. Veitch), **H.C.**—See JOURNAL, vol. 45, p. 344. All survived. Ready May 1.

29. **GRAND ADMIRAL** (Nutting).—A mixed stock of the last.

88. ALtenburg (Heinemann).—Compact; foliage somewhat blistered; margin tinged reddish-brown; heads firm, of good quality, tender, mild. Ready May 7. Stood well.

* * *

30, 31. VICTORIA RED-EDGED (Barr, Nutting).—See JOURNAL, vol. 45, p. 344. 10 per cent. failed. No. 30 the better stock. Ready May 3.

* * *

32. HARDHEAD (Burpee).—Compact; foliage blistered, medium dull greenish-brown, margins tinged brown; heads firm, of fair quality, tender, mild. Ready May 5. Stood well. 8 per cent. failed.

* * *

67. WINTER BROWN (Barr), H.C.—Compact; foliage somewhat blistered, medium dull, greenish-brown, margins tinged brown; heads firm, of good quality, somewhat bitter, tender. Ready May 3. Stood well. All survived.

69. WINTER PASSION BROWN (Nutting).—A somewhat larger and more leafy form of 'Winter Brown.' Ready May 5. 7 per cent. failed.

* * *

68. WINTER PASSION (Heinemann).—Character as for 'Winter Brown' but foliage of a paler shade, margins somewhat tinged reddish brown. Ready May 1. 11 per cent. failed. Not 'White Chavigne,' which is often known by this name.

* * *

33. WINTER KING (Barr).—Compact; foliage blistered, medium dull green, brownish-red, margins tinged reddish-brown; heads firm, of good quality, tender, bitter. Ready May 5. Stood well. 4 per cent. failed.

2. Foliage not tinged brown or red.

(a) Foliage medium green, leaf margins yellower.

1. Medium.

42. WHITE OF ROTTERDAM (van Beusekom).—Compact; foliage blistered and crumpled; heads firm, of good quality, tender, mild. Ready May 3. Runs quickly. 7 per cent. failed.

2. Medium large.

34, 35. MARKET FAVOURITE (Watkins & Simpson, R. Veitch).—See JOURNAL, vol. 45, p. 345. Ready April 27. Irregular in coming in. Stocks mixed.

* * *

43. FELTHAM KING (Watkins & Simpson).—Compact; foliage blistered, somewhat crumpled; heads firm, of fair quality, tender, mild. Stood well. Ready May 3. 7 per cent. failed.

* * *

36-40. MCHATTIE'S GIANT (Cullen, Watkins & Simpson, Barr, A. Dickson, Nutting).—See JOURNAL, vol. 45, p. 357. Ready May 28. Stood well. 14 per cent. failed.

(b) Foliage medium dark green.

1. Medium large.

46, 47. CHAVIGNE (Watkins & Simpson, Nutting).—See JOURNAL, vol. 45, p. 345. Ready May 5. Very slow to bolt. 11 per cent. failed.

* * *

48, 50. HAMMERSMITH HARDY GREEN (Cullen, Watkins & Simpson), A.M.

52. HARDY HAMMERSMITH (Dobbie)

—See JOURNAL, vol. 45, p. 357. Ready May 5. Slow to run to seed. 8 per cent. failed. Dark form. Suitable for garden or market use.

49. HARDY GREEN HAMMERSMITH (KELWAY)

51. HAMMERSMITH (Barr) } —Paler forms of the last,

otherwise similar.

53. YATES WINTER (Barr).—Similar to pale form of 'Hammersmith.'

54-58. LEE'S IMMENSE (Cullen, Watkins & Simpson, Barr, R. Veitch, Nutting).—A paler form of 'Hammersmith.'

2. Medium size.

60. WAYAHEAD (Burpee).—See JOURNAL, vol. 45, p. 346. Ready May 7. Stood well. 12 per cent. failed.

(c) *Foliage medium green.*

1. Large.

9. EXCELSIOR (Harrison).—Compact; foliage somewhat blistered and crumpled; heads firm, of fair quality, tender, somewhat bitter. Ready May 7. Stood well.

10. BUTTERHEAD (Burpee).—Very similar to 'Excelsior,' but ready May 10. Irregular in turning in. 60 per cent. failed.

2. Medium size.

59. NANSEN OR NORDPOL (Heinemann).—See JOURNAL, vol. 45, p. 346. Ready May 9. Stood well. 14 per cent. failed.

* * *

61. MONUMENT (A. Dickson).—See JOURNAL, vol. 45, p. 346. Ready May 26 5 per cent. failed.

* * *

62. COVENT GARDEN WINTER WHITE (Barr).—See JOURNAL, vol. 45, p. 357. Ready May 28. 5 per cent. failed. Stood well.

* * *

63, 64. SCHOFIELD'S HARDY WINTER (Barr, Cooper-Taber).—See JOURNAL, vol. 45, p. 357. Ready May 2. No. 64 not so good a stock as No. 63, and somewhat later to mature. 11 per cent. failed.

(d) *Foliage light yellowish-green, plant small.*

65. LEMON QUEEN (Dobbie).—See JOURNAL, vol. 45, p. 347. Ready May 5. Stock not quite true. 5 per cent. failed.

(b) *Black-seeded.*

AWARDS.

77. BRITTANY WINTER WHITE, F.C.C. May 3, 1923. Sent by Messrs. Barr (A.M. Barr, 1918).

85. WHITE MADEIRA, F.C.C. May 3, 1923. Sent by Messrs. Barr (H.C. Barr, 1918).

79-84. ALL THE YEAR ROUND, A.M. May 15, 1923. Sent by Messrs. W. H. Simpson of Birmingham, Watkins & Simpson, Barr, A. Dickson of Belfast, Toogood of Southampton, Dobbie.

70, 71. RELIANCE, H.C. May 15, 1923. Introduced by Messrs. Watkins & Simpson, and sent by Messrs. Barr and Watkins & Simpson.

1. EARLY FRENCH FRAME, H.C. May 3, 1923. Sent by Messrs. Watkins & Simpson.

1. Foliage more or less coloured brown or red.

(a) *Large.*

66. MAXIMUM (A. Dickson).—See JOURNAL, vol. 45, p. 347. Ready June 1. Stood well. 11 per cent. failed.

(b) *Medium size.*

70, 71. RELIANCE (Barr, Watkins & Simpson), H.C.—See JOURNAL, vol. 45, p. 348. Ready May 2. Stood well. 13 per cent. failed. Suitable for garden use.

* * *

72. CALIFORNIA CREAM BUTTER (Burpee).—See JOURNAL, vol. 45, p. 348. Ready May 1. 13 per cent. failed.

73-75. **CONTINUITY** (W. H. Simpson, R. Veitch, A. Dickson).—See JOURNAL, vol. 45, p. 348. No. 73 not quite true. Ready April 28. Stood well but more suitable for spring sown. 14 per cent. failed.

2. Foliage wholly green.

Dark dull green.

(a) *Small medium.*

41. **PERFECT GEM** (R. Veitch).—Compact; foliage blistered and crumpled; hearts very firm, of fair quality, tender, mild. Ready April 30. 7 per cent. failed. Stood well.

Medium dark green.

(b) *Of medium size.*

76. **EXHIBITION** (Dobbie).—See JOURNAL, vol. 45, p. 348. Ready May 5. 13 per cent. failed.

(c) *Large.*

77. **BRITTANY WINTER WHITE** (Barr), **F.C.C.**—A paler and not tinged counterpart of the large form of 'Stanstead Park.' Ready May 1. Stood very well. Suitable for either garden or market use. A very good variety.

Medium dull green.

(d) *Of medium size.*

78. **EARLY MARKET ALL HEART** (Watkins & Simpson).—See JOURNAL, vol. 45, p. 349. Ready May 5. 15 per cent. failed.

* * *

44. **BECK'S HARDY WHITE DUTCH** (Cooper-Taber).—Compact; foliage somewhat blistered and crumpled; hearts firm, of fair quality, tender, mild. Ready May 6. Stood well. 11 per cent. failed.

3. Green, but margins of leaves paler.

(a) *Large.*

85. **WHITE MADEIRA** (Barr), **F.C.C.**—Compact; foliage somewhat blistered and crumpled; heads very firm, of good quality, tender, mild. Ready May 1. Stood very well. 7 per cent. failed. Suitable for either garden or market use. A very good variety.

(b) *Medium size.*

Medium dull green.

79-84. **ALL THE YEAR ROUND** (W. H. Simpson, Watkins & Simpson, Barr, A. Dickson, Toogood, Dobbie), **A.M.**—See JOURNAL, vol. 45, p. 349. 7 per cent. failed. Suitable for either garden or market use. Ready May 2.

(c) *Small.*

(i). Medium dark dull green.

86. **WHEELER'S TOM THUMB** (Toogood) } .—See JOURNAL, vol. 45, p. 350.
 87. **TOM THUMB** (W. H. Simpson) }. Ready April 26. Stood very well. 18 per cent. failed. Suitable for frame culture.

(2). Medium dull yellowish-green.

1. **EARLY FRENCH FRAME** (Watkins & Simpson), **H.C.**—Very compact; foliage somewhat blistered; heads firm, of good quality, tender, mild. Ready April 28. Stood well. 5 per cent. failed. Suitable for growing in frames 9 inches apart.

C. SEMI-COS VARIETIES.

1. Seeds white.

AWARDS.

93. **Gem, A.M.** May 3, 1923. Introduced and sent by Messrs. Harrison of Leicester.
 91, 92. **Winter Density, A.M.** May 3, 1923. Sent by Messrs. R. Veitch and Watkins & Simpson.
 89. **Density, A.M.** May 3, 1923. Sent by Messrs. Nutting.

93. **GEM** (Harrison), **A.M.**—See JOURNAL, vol. 45, p. 350. As 'Little Gem'. Ready May 1. Stood very well.

91, 92. **WINTER DENSITY** (R. Veitch, Watkins & Simpson), **A.M.**—Similar to 'Gem.'

89. **DENSITY** (Nutting), **A.M.**—Similar to 'Gem.'

* * *

90. **WINTER DENSITY** (Toogood).—A somewhat larger and darker form of 'Gem,' otherwise similar. Ready May 7.

D. COS VARIETIES.

1. Seeds white.

(a) Foliage not tinged red or brown.

i. Large, self-hearting.

(a) *Dark dull green.*

94-96. **LORJOIT'S GREEN Cos** (Nutting, R. Veitch, Watkins & Simpson).—See JOURNAL, vol. 45, p. 350. Ready May 15. 14 per cent. failed. Stood well.

* * *

97. **DWARF WHITE HEART** (Burpee).—Of a somewhat darker green than last. Ready May 15.

(b) *Medium dark green.*

i. Medium large, self-hearting.

98. **COVENT GARDEN WINTER WHITE** (Barr).—See JOURNAL, vol. 45, p. 351. Ready May 24. Irregular in reaching maturity. 18 per cent. failed.

(c) *Medium green.*

i. Of medium size, need tying.

99, 105. **HICK'S HARDY WHITE** (Dobbie, Cullen)
 100, 104, 107. **HARDY WINTER WHITE** (Nutting,

Watkins & Simpson, Kelway)

101, 102, 103. **HICK'S HARDY WINTER WHITE** (Toogood, Cooper Taber)

106. **HICK'S HARDY WINTER** (R. Veitch).

p. 352. Ready June 4. Did not stand long. 7 per cent. failed. No. 99 not quite true.

2. Seeds black.

AWARD.

110. **Goldring's Bath Cos, A.M.** June 15, 1923. Raised by Mr. Goldring and sent by Messrs. Toogood of Southampton.

(a) Foliage tinged or coloured brown or red.

i. Self-hearting.

110. **GOLDRING'S BATH COS** (Toogood), **A.M.**—Compact; foliage somewhat blistered; dark dull greenish brown, margins tinged brown, of medium thickness; heads firm, of good quality, crisp, mild. Ready May 11. Slow to run to seed. 5 per cent. failed. Suitable for garden use.

* * *

109. **SUGARLOAF Cos** (Nutting).—See JOURNAL, vol. 45, p. 352. Ready June 2. Stood well. 11 per cent. failed.

2. Need tying.

(a) Large.

111. WINTER RED (Barr).—See JOURNAL, vol. 45, p. 352. Ready June 4. 9 per cent. failed.

* * *

113, 115, 118. BLACK-SEEDED BATH Cos (Nutting,

Cooper-Taber, Watkins & Simpson)

112, 114. BATH OR BROWN Cos (Dobbie, R. Veitch)

116, 117. BATH Cos (Cullen, W. H. Simpson)

P. 352. Ready June 8. 5 per cent. failed. No. 112 not quite true.

119. COVENT GARDEN WINTER BROWN (Barr).—Characters as for 'Bath Cos.'

(b) Foliage not tinged red or brown.

1. Self-hearting.

120. THE BARNUM (Barr).—See JOURNAL, vol. 45, p. 353. Ready June 8. Stood well. 11 per cent. failed. Stock not quite true.

2. Need tying.

(a) Foliage dark dull green, medium large.

108. ROYAL GREEN (Barr).—Somewhat spreading : foliage slightly blisters ; hearts rather soft, loose, crisp, somewhat bitter. Ready June 8. 5 per cent. failed.

ONIONS TRIED AT WISLEY, 1923.

We have previously drawn attention to the fact that the sowing of Onions of all types in the open in August and transplanting in early spring results in the production of heavy crops of bulbs with good keeping qualities if the proper varieties are chosen. This method of cultivation protects the plants against the attack of the onion-fly, and the pest can also be avoided by sowing under glass in spring and transplanting. No method of treatment appears entirely satisfactory, however, where the seed is sown directly in the open in spring. Several means may be adopted to mitigate the attack, but none will certainly completely prevent it. The attack is, however, seasonal in some measure, and in 1923 the amount of damage done by the fly was negligible, and the methods adopted to mitigate the attack enabled crops of all varieties grown to be secured.

One hundred and twenty-two stocks were entered in the trial and sown on March 20, 1923. With the exception of a stock of Blood Red and the Giant Onion of Japan, all the seed germinated satisfactorily and fair crops were secured, most being ready for lifting in August.

Onions are grown for pickling, flavouring, salads, and for cooking whole either in the young or in the mature stages. The large, soft Onions which mature early do not, as a rule, keep well. The Lisbon, Tripoli and Rocca types are good examples of these, whereas Bedfordshire Champion, James' Longkeeping, Giant Zittau, Spanish, are excellent in this respect. An instructive table dealing with the question is given in our JOURNAL, vol. 43, pp. 149, 150, to which reference may be made. As most young Onions may be used in salads, no special reference is made to these below, but Onions suitable for pickling are particularly pointed out.

It will be apparent from the notes which are given below that Onions of more than one type are being distributed under a single name. This is particularly the case perhaps with the popular Ailsa Craig, and is greatly to be regretted. Equally to be deprecated is the giving of two names to one type of Onion, and it is to be hoped that the notes may be of some assistance in avoiding these sources of confusion.

In other cases actual mistakes in naming appear to have been made, as, for instance, where a superb stock of Anglo-Spanish Onion was received under the name of Giant Zittau. There are many causes for the confusion that exists in the naming of varieties, and not all of them are avoidable, but the need that exists for remaking many varieties of Onion, just as there is need for similar clearing up of varieties of other vegetables, may be the means of eliminating much

of this confusion if an agreed definition of the characteristics which should distinguish each variety can be arrived at.

It was the exception rather than the rule to find a perfectly true stock free from admixture with "rogues" differing in colour, shape, size or other marked characteristic from the type, and this is reflected by the fact that only four stocks were deemed worthy of Awards of Merit on the several occasions on which the Fruit and Vegetable Committee inspected them. Many other varieties which had been given awards in previous trials had either been superseded or were too much mixed. Progress is being made in obtaining "clean" stocks, but the conditions imposed by the war years are not immediately to be remedied where varieties have become mixed and rogueing had, perforce, to be carried out imperfectly and perhaps perfunctorily.

Comparatively little Onion seed is grown in England, and of late years considerable quantities have been drawn from California. Seed raised in California almost always produces plants that mature earlier by about a fortnight than do the plants raised from English or European seed of the same varieties, with a consequent considerable diminution in the weight of crop produced. European Onion seed is, therefore, other things being equal, to be preferred to Californian.

It may be taken that the varieties to which awards have been given are suitable for both private and commercial gardens if the special purposes which are noted in the description are taken into account.

AWARDS, NOTES AND DESCRIPTIONS.

A. WHITE VARIETIES.

AWARDS.

Silver Globe, A.M. August 27, 1923. Introduced and sent by Messrs. Barr of Covent Garden, London, W.C.

White Portugal or Silver Skin, H.C. August 10, 1923. Sent by Messrs. Morse of San Francisco, California.

Covent Garden Silver Skinned Pickling, H.C. August 10, 1923. Sent by Messrs. Barr.

1. Bulbs flat-round.

WHITE PORTUGAL or SILVER SKIN (Morse), **H.C.**—Described vol. 43, p. 151. A good stock. Should be sown thickly. Pickling variety.

COVENT GARDEN SILVER SKINNED PICKLING (Barr), **H.C.**—Small; solid; inner skin whitish green. Somewhat flatter than 'Large Silver Flat.' Pickling variety.

LARGE SILVER FLAT (Barr).—Very much like the last, but a mixed stock.

2. Bulbs oval.

SILVER GLOBE (Barr), **A.M.**—Described vol. 43, p. 151. Crop 15½ lb. An even stock.

SILVER GLOBE (Dickson & Robinson).—Less regular stock and somewhat mixed.

SOUTHPORT WHITE GLOBE (Morse).—Like the last but less typical in shape.

WHITE GLOBE (Carter).—Not quite so good a stock as 'Silver Globe.'

WHITE LISBON (Barr).—Described vol. 43, p. 151. A mixed stock.

B. YELLOW VARIETIES.

AWARDS.

Anglo-Spanish, A.M. August 27, 1923. Sent by Messrs. Heinemann of Erfurt, Germany (sent as 'Giant Zittau').

Rousham Park Hero, A.M. August 27, 1923. Raised by Mr. Deverill of Banbury and sent by Messrs. Watkins & Simpson, of Covent Garden, London, W.C. (A.M. 1898.)

Premior, A.M. August 27, 1923. Raised and sent by Messrs. Dickson & Robinson of Manchester.

Rousham Park Hero selected, H.C. August 27, 1923. Sent by Messrs. Barr.

Maincrop, H.C. August 27, 1923. Raised and sent by Messrs. Dobbie of Edinburgh.

White Spanish, H.C. August 27, 1923. Sent by Messrs. Cooper-Taber, of Southwark Street, London, S.E.

Ailsa Craig, H.C. August 27, 1923. Sent by Messrs. Morse, of San Francisco, California.

Cranston's Excelsior, H.C. August 27, 1923. Raised by Mr. Cranston, and sent by Messrs. A. Dickson of Newtownards, Ireland.

Ailsa Craig, H.C. August 27, 1923. Sent by Messrs. Cooper-Taber. ('Prizetaker' type.)

Ohio Yellow Globe, H.C. August 27, 1923. Sent by Messrs. Morse and Messrs. Nutting of Southwark Street, London, S.E.

Golden Globe, H.C. August 27, 1923. Raised and sent by Messrs. Dobbie.

Bedfordshire Champion, H.C. August 27, 1923. Sent by Messrs. Watkins & Simpson and Messrs. Barr. (A.M. 1907.)

Density, H.C. August 27, 1923. Raised by Messrs. Cooper-Taber, and sent by Mr. Dawkins of King's Road, Chelsea.

Up-to-Date, H.C. August 27, 1923. Sent by Messrs. A. Dickson.

White Spanish, C. August 27, 1923. Sent by Messrs. Cooper, Taber.

Giant Zittau, C. August 27, 1923. Sent by Messrs. Watkins & Simpson.

I. Bulbs flat-round.

ANGLO SPANISH (Heinemann). **A.M.**—Bulb of medium size; solid; outer skin sulphur-yellow, inner whitish green. Crop, 22 lb. A very good stock. This stock was sent under the erroneous name of 'Giant Zittau.'

WHITE SPANISH ENGLISH (Cooper-Taber). **H.C.**—Characters of last. Crop 13 lb. (English seed.)

WHITE SPANISH (Cooper-Taber). **C.**—Characters of last, but of a darker straw colour and later. Crop 19½ lb. (French seed.)

BANBURY CROSS (Harrison).—Similar to 'White Spanish,' but contained rogues. Crop 20½ lb.

SOMERSET HERO (Barr).—Of 'White Spanish' type, but contained red-skinned rogues. Crop 28½ lb.

VERTUS (Nutting).—Of 'White Spanish' type, but contained red rogues and variable in shape.

LORD KEEPER (A. Dickson).—Of 'White Spanish' type. Crop 17½ lb.

ROUSHAM PARK HERO (Toogood).—Of 'White Spanish' type. A misnomer.

TREBONS (R. Veitch).—Of 'White Spanish' type. A misnomer. Stock mixed.

NUNEHAM PARK SELECTED (Barr).—Of 'White Spanish' type, but somewhat darker. Stock not quite true.

DANVERS YELLOW FLAT (Morse, Barr).—Darker than 'White Spanish' type. Stocks not true.

ROUSHAM PARK HERO (Watkins & Simpson). **A.M.**—Bulb of medium size; solid; outer skin greenish-straw, becoming darker when ripe, inner white. Crop 21 lb.

ROUSHAM PARK HERO SELECTED (Barr). **H.C.**—Characters of last, but less regular. Crop 24 lb.

ROUSHAM PARK HERO (R. Veitch, Carter).—Similar to last, but stock not quite true.

MAINCROP (Dobbie). **H.C.**—Of 'Rousham Park' type. Crop 20½ lb. A good stock.

CANTELLO'S PRIZE (Barr).—Very similar to 'Rousham Park.' A mixed stock.

IRON HEAD (Heinemann).—Of 'Rousham Park' type, mixed in shape.

WALKER'S EXHIBITION (Nutting, Barr).—Described vol. 43, p. 157. Crop 21 lb. and 24 lb. Stocks not quite true. Near 'Rousham Park' type.

GIANT ZITTAU (Watkins & Simpson), **C.**.—Described vol. 43, p. 151. Crop 16½ lb. Rather more globular than other stocks of this variety.

GIANT ZITTAU (Toogood, Barr, Nutting).—Characters of last, but flatter. The first stock was very mixed, the others variable in shape.

YELLOW STRASBURG OR YELLOW DUTCH (Morse).—Bulb small; solid; outer skin straw, inner whitish-green. Crop 9 lb.

2. Bulbs oval.

Premier (Dickson & Robinson), **A.M.**.—Bulb large; solid; outer skin pale straw, inner white. Of 'Ailsa Craig' type. A very good stock. Crop 26½ lb.

Premier (Dickson & Robinson).—Less regular stocks of last.

AILS A CRAIG (Morse), **H.C.**.—Very similar to last, but an earlier stock and bulbs not so large. Crop 22 lb.

AILS A CRAIG (Nutting, Clucas, Morse, Carter, A. Dickson, R. Veitch, Toogood, Dobbie). Characters as for 'Premier,' but outer skin medium straw. The third and fourth stocks contained bulbs of a flatter type, and the first was somewhat tinged with red and contained red and white skinned rogues. The three stocks before the last were much mixed.

AILS A CRAIG EXTRA-SELECTED (Barr).—A mixed stock.

AILS A CRAIG (Watkins & Simpson).—Characters as for the foregoing, but bulbs rounder and with one side at base rather flattened. Outer skin medium straw. A much rounder form of 'Ailsa Craig.' Crop 20½ lb.

CRANSTON'S EXCELSIOR (A. Dickson), **H.C.**.—Described vol. 43, p. 152. Very similar to 'Ailsa Craig,' but slightly rounder. Crop 29½ lb.

CRANSTON'S EXCELSIOR (R. Veitch, Dobbie, Barr).—Characters of last, but the first contained white rogues, and all were variable in shape. The last was somewhat rounder than the others. Crop 35 lb.; 28 lb.; 32 lb.

PRIZETAKER (Morse, Barr, R. Veitch).—Foliage emerald-green, persistent; bulb of medium size, solid; outer skin straw brown, inner white. Stocks variable in shape. The last contained red rogues. Crop 33 lb.; 30½ lb.; 27½ lb.

AILS A CRAIG (Cooper-Taber), **H.C.**.—Of 'Prizetaker' type. Crop 38½ lb.

AILS A CRAIG (Kelway, W. H. Simpson).—Variable stocks of 'Prizetaker' type. Bulbs of latter slightly flatter than former. Crop 22½ lb.; 30½ lb.

LONG KEEPER (Barr).—Of 'Prizetaker' type. Crop 22½ lb.

MONARCH (Barr).—Of 'Prizetaker' type. A mixed stock in colour and shape.

GOLDEN BALL (Nutting, Barr).—Bulb of medium size, solid; outer skin medium straw, inner white. Mixed in shape. Crop 19½ lb.; 23 lb.

OHIO YELLOW GLOBE (Morse, Nutting), **H.C.**.—Described vol. 43, p. 153. Crop 18½ lb.; 19 lb. The last sent as 'Danvers's Yellow Globe.'

SOUTHPORT YELLOW GLOBE (Morse).—Very similar to 'Ohio Yellow Globe,' but bulbs paler. Variable in shape. Crop 18 lb.

BEST OF ALL (Watkins & Simpson, Barr).—Of 'Southport Yellow Globe' type, but larger bulbs. Crop 27 lb.; 32 lb. The last a mixed stock. Raised by Mr. Peters of Leatherhead.

TREBONS (Barr).—Described vol. 43, p. 154. Not quite true stock. Crop 32½ lb.

GOLDEN GLOBE (Dobbie), **H.C.**.—Bulb of medium size, round, very solid; outer skin pale straw, inner white. Crop 22 lb. A true stock.

RECORD (Carter, Barr).—Described vol. 43, p. 153. Contained silver-skin rogues. Crop 42 lb.; 44 lb. Of 'Giant Rocca' type.

BEDFORDSHIRE CHAMPION (Watkins & Simpson, Barr), **H.C.**—Bulb of medium size, deep round, very solid; outer skin straw-brown, inner white. Crop $23\frac{1}{2}$ lb.; 26 lb.

BEDFORDSHIRE CHAMPION (Carter, R. Veitch, Dickson & Robinson, W. H. Simpson).—Similar to last, but stocks variable in shape. The second and third contained paler rogues. Crop 21 lb.; 17 lb.; 21 lb.; $21\frac{1}{2}$ lb.

AILSA CRAIG (Harrison).—A variable stock of 'Bedfordshire Champion.'

HOLBORN (Carter, Barr).—A rounder and deeper 'Bedfordshire Champion.' Stocks mixed. Crop 28 lb.; 32 lb.

IRONSIDE (Cannell).—Of 'Bedfordshire Champion' type; contained flat and red rogues. Crop $18\frac{1}{2}$ lb.

DENSITY (Dawkins), **H.C.**—A selection of 'Bedfordshire Champion' differs from this, having rounder and paler bulbs. Crop 23 lb.

DENSITY (Cooper, Taber).—A mixed stock of last. Crop $21\frac{1}{2}$ lb.

UP-TO-DATE (A. Dickson), **H.C.**—Bulb of medium size, deep, round, solid; outer skin dark straw, inner white. Crop 24 lb. 'Up-to-Date' is a flatter type than 'Bedfordshire Champion.'

UP-TO-DATE (Nutting, Barr).—Variable in shape, but similar to last. Crop 22 lb.; $21\frac{1}{2}$ lb.

WROXTON (Watkins & Simpson, A. Dickson, R. Veitch).—Bulb of medium size, deep round, solid; outer skin straw-brown, inner white. The last two stocks of mixed character. Crop $22\frac{1}{2}$ lb.; 18 lb.; 24 lb.

BEDFORDSHIRE CHAMPION (Kelway).—A mixed stock of 'Wroxton' type.

C. BROWN VARIETIES.

AWARD.

Australian Brown, H.C. August 27, 1923. Sent by Messrs. Morse.

1. Bulbs flat-round.

AUTUMN TRIUMPH (Dawkins).—Bulb of medium size, solid; outer skin straw-brown, inner white. Variable in shape. Crop 24 lb.

DEPTFORD (Barr).—Bulb medium to large, solid; flatter than last. Stock mixed. Crop 35 lb. Of 'Brown Spanish' type.

ROYAL KEEPER (Dickson & Robinson).—Bulb large, solid; somewhat darker than 'Deptford.' Not quite true. Crop 28 lb.

ALL THE YEAR ROUND (Barr).—A mixed stock.

DANVERS YELLOW GLOBE (Barr, Morse).—Stocks mixed, of 'Danvers Yellow Flat' type.

2. Bulbs oval.

FROXFIELD (Barr).—Described vol. 43, p. 154. Mixed with silver-skin rogues.

DANVERS YELLOW (Dickson & Robinson).—Bulb of medium size, solid; straw-brown, contained red and flattish rogues. Crop 25 lb.

GOLDEN CROWN (Barr).—Very similar to last, but smaller bulbs. Crop 15 lb.

AUSTRALIAN BROWN (Morse), **H.C.**—Described vol. 43, p. 154. A good stock. Crop 19 lb.

PERFECT LONG KEEPER (Barr).—Of 'Australian Brown' type. Crop 15 lb.

BROWN GLOBE (Kelway).—Described vol. 43, p. 154. Variable in shape. Very much like 'Australian Brown.' Crop 18 lb. A seedling from Mr Holman was larger than this, but otherwise very much like it. Crop $23\frac{1}{2}$ lb.

JAMES' LONG-KEEPING (Barr).—Described vol. 43, p. 154. Mixed in shape.

GOLDEN GLOBE (Barr).—Very similar to last. Variable in shape. Crop 25 lb.

3. *Bulbs coconut-shaped.*

COCOA NUT (Dickson & Robinson).—Bulbs large, very solid; outer skin greenish-straw, ripening to straw-brown, inner white. Crop 27 lb. A true even stock.

COCOA NUT (Barr).—A very mixed stock.

D. RED VARIETIES.

AWARD.

Red Flag, H.C. August 27, 1923. Introduced and sent by Messrs. Kelway of Langport, Somerset.

1. *Bulbs flat.*

RED WETHERSFIELD (Morse, Barr).—Described vol. 43, p. 155. The last a mixed stock. Crop 17 lb.; 23 lb.

FLAT RED SELECTED (Dickson & Robinson).—Of 'Red Wethersfield' type. Crop 19 lb.

EXTRA EARLY RED FLAT (Morse).—Of 'Red Wethersfield' type. Crop 20 lb.

{ **RED SELECTED** (Dobbie).—Of 'Red Wethersfield' type. Crop 21 lb.

BLOOD RED (Carter).—Of 'Red Wethersfield' type. Crop 31½ lb. Contained white rogues.

2. *Bulbs oval.*

SOUTHPORT RED GLOBE (Morse).—Described vol. 43, p. 155. Variable in size. Crop 19 lb.

RED FLAG (Kelway), H.C.—A good stock of 'Southport Red Globe.' Crop 23½ lb.

RED GLOBE (Carter).—Of 'Southport Red Globe' type. Contained flat rogues. Crop 18 lb.

BLOOD RED GLOBE (Nutting).—Of 'Southport Red Globe' type, but mixed with flat and white rogues. Crop 17½ lb.

CRIMSON GLOBE (Dickson & Robinson, Barr).—Of 'Southport Red Globe' type. The first was mixed with white and flat rogues; the last contained brown rogues. Crop 21 lb.; 18 lb.

BOOK REVIEWS.

"The Romance of Plant Hunting." By Captain F. Kingdon Ward. 8vo. 275 pp. (Edward Arnold, London, 1924.) 12s. 6d. net.

British amateurs who live at home in ease, or in such measure of ease as the strikes epidemic will allow them, do well to remember with gratitude the strenuous work undertaken, and the risks to life and limb incurred, by the intrepid collectors who have furnished them with such affluence of exotic treasure. Nor must we grudge them the right of grumbling, whereof Captain Kingdon Ward avails himself liberally in the first two chapters of his "Romance of Plant Hunting." It had been better, we think, to place these chapters at the end of the book, for they form a discouraging prelude to a fascinating narrative. The British public in general, nurserymen, gardeners, and amateurs in particular, all come in to complaint from the author; but he does not mean to be taken literally, else he would never have penned such a sentence as—"In England to-day only the mean, the sordid, and the sorrowful are revealed; beauty never" (p. 51). He deprecates commercialism in horticulture; yet he makes the quaint proposition that a collector's spoils should be protected by copyright.

Howbeit this lively author, having blown off the steam, forgets all grievance and plunges into his story with enthusiasm. In his earlier volume, "The Mystery Rivers of Tibet," he gave very important information about the geography and geology of the little-known Salween region and about the Nung, a primitive race inhabiting north-eastern Burmah. In the present book he deals more exclusively with plant hunting and its vicissitudes in Yunnan. Rich as is the harvest garnered by himself and other collectors, he considers that they have "as yet only skirmished on the fringes of botanical Asia. The most difficult part remains to be taken in hand." Extremes of weather are enough to test any traveller's temper and constitution—tropical heat in the valleys, blizzard and severe frost above the forest. And as for the rainy season—

In England they grumble at twenty-four hours' rain! Why, it has scarcely ceased raining here for twenty-four days and nights, and there is another three months of this yet. . . . Few things are more depressing in a mountain camp than ceaseless rain day and night. The rattle of the rain on the tent becomes maddening. . . . there is something peculiarly malevolent in the ceaseless drip, drip, drip from the trees. . . . Nothing is visible. Even the trees are hidden or loom up vaguely through the blinding sheets of rain.

The depressing influence of such weather is increased by months of isolation from one's own countrymen.

An extraordinary sense of remoteness overlays one; we seem to be in a new and injurious world, cut off from all that is dear and familiar by this impenetrable void. In the immense solitude which overwhelms us, even the roaring waters sound unreal, and the dripping trees loom phantom-like through the murk.

The business of a collector being to collect, it is inevitable that among his booty there must be many species which, though of botanical importance, possess no quality entitling them to esteem as garden plants. Captain Ward says frankly that none of the dozens of Asiatic barberries recently introduced approaches the beauty of the Chilean *Berberis Darwini*. There are many others, like *Myosotis Hookeri*, of exquisite beauty, which, in his opinion, can never become reconciled to a British environment. His observations on this point (pp. 152-154) deserve attentive perusal by persons interested in the cultivation of alpine plants.

At moderate elevations, such as 10,000 to 13,000 feet, plants have a much greater range of altitude than people imagine. A range of 5,000 feet for a species is by no means rare, and 3,000 or 4,000 feet is common. These plants are elastic. Their constitution is more adaptable than those which are sensitive to comparatively small changes of altitude. But it is just those plants which are not found above 5,000 feet or below 15,000 which lack the necessary resilience.

One is tempted to quote from almost every one of Captain Ward's chapters, so full are they of suggestive observation. The lovely *Nomocharis*, "growing in scores—in hundreds—colouring the hillside under the lash of the July rain," has driven many an amateur and many a gardener to despair in this country. The author perhaps explains the cause of failure when he tells us that on its native hills the bulbs lie eight or ten inches deep in sandy loam. On the other hand, *Rhododendron hippophaeoides* is always a bog plant in Yunnan, whereas none of the Lapponicum series is happier or flowers more profusely than this species grown in an ordinary garden border. Captain Ward lays stress upon the influence of aspect upon the growth of large-leaved rhododendrons, a matter to which some of us have not given enough attention. He describes how the north-west side of a certain mountain was covered with *R. Beesianum*, *Traillianum* and *coccinopeplum*, the sunny side being clothed with turf only, sprinkled with flowers. It is reassuring to be told that May frost, the spectre that haunts the rhododendron enthusiast in Britain, is not infrequent in the home of the genus. "I have seen," says Captain Ward, "*R. yunnanense*, when in full bloom, blasted beyond recognition."

While this book is brimful of sound information, that is relieved by passages here and there of excellent humour. Such are the chapter entitled "The Inn of Golden Happiness" and the description of target practice at Muli (pp. 143-144). We congratulate the author on the production of a book both instructive and amusing.

"Standardized Plant Names: A Catalogue of Approved Scientific and Common Names of Plants in American Commerce." Prepared by Frederick Law Olmstead, Frederick V. Coville, Harlan P. Kelsey. American Joint Committee on Horticultural Nomenclature, Salem, Mass., 1923. Pp. xvi + 546. (Mount Pleasant Press, Harrisburg, Pa.) Prices, \$5.00, and \$6.50 for copies in flexible covers.

Horticultural nomenclature in America has long been in a state of confusion. This is partly due to the fact that two different systems of nomenclature are current among botanists in the United States, some of whom follow the International Rules while others adhere to the American Code. Further trouble has been caused by the action of a few extremists, who treat every little group of related species as a distinct genus—*Astragalus*, for example, being broken up

into nineteen "genera." The confusion of names may be illustrated by the case of the common Virginia creeper, which was "catalogued in 1916 under no less than six Latin binomials—*Ampelopsis quinquefolia*, *A. virginica*, *Parthenocissus quinquefolia*, *P. virginica*, *Vitis hederacea*, and *Pseuderis quinquefolia*."

The situation eventually became so serious that a joint committee was appointed by various American horticultural Associations, and it was "decided that the only practicable remedy is, for purposes of practical convenience in the horticultural trades, to agree arbitrarily upon some one name for each plant, by which name it can be designated for a definite term of years, with provision for revising and correcting the list at probably five- or ten-year intervals, after due notice to all concerned." The volume under review is the result. "The Committee adopted as a general basis the scientific names given in Bailey's 'Standard Cyclopedia of Horticulture,' and whenever the approved scientific name in 'Standardized Plant Names' differs from the Cyclopedia name, the latter is given in parenthesis, followed by the abbreviation Cy." Similarly, the abbreviations "Ag." and "Ar." denote names used respectively at the Economic Herbarium of the United States Department of Agriculture and the Arnold Arboretum. So-called "common names" are also given in most cases.

The general arrangement of the work is alphabetical, but for convenience of reference the genera and species of Cactaceae are brought together in one consolidated list, and the same applies to the Ferns, Grasses, Orchids, and Palms. Approved scientific names are printed in bold-face type, and synonyms in italics, no authors' names being added in either case. Common names are in small capitals. All specific names are spelt with a small initial letter—e.g. *Acer negundo* and *Corylopsis veitchiana*, and genitives of personal names of the second declension are terminated by "i" instead of "ii"—e.g. *Solanum wendlandi* and *Crataegus smithi*.

A large part of the book is occupied with the enumeration of horticultural varieties, which are given in a separate list at the end of each genus. Thus the horticultural account of *Rosa* occupies 50 pages and includes the names of over 2,000 varieties, that of *Iris* covers 37 pages and over 2,000 varieties, *Gladiolus* has 22 pages and over 900 varieties, *Dahlia* 11 pages and about 600 varieties, and *Paeonia* 9 pages and about 750 varieties.

The quality of the work is extremely unequal, and the genera recognized in the various groups are far from being equivalent. The account of the Cactaceae is by Dr. J. N. Rose, who has recently monographed the family in collaboration with Dr. Britton. Dr. W. R. Maxon is responsible for the Ferns, Dr. Hitchcock for the Grasses, and Messrs. Oakes Ames and F. Tracy Hubbard for the Orchids. The names of these botanists afford a guarantee of the excellence of these sections of the work. On the other hand, in certain families for which no botanist in particular seems to have been responsible, the standard is low, and the Committee would have been well advised had it followed the nomenclature of Bailey's Cyclopedia more closely. The Bignoniaceae may be taken as an example. "The Committee seeks . . . to provide a convenient and practicable means for bringing the matured results of scientific research into use in the horticultural trades without damage and by agreement at definite periods." In the case of Bignoniaceae just the opposite result has been attained. By placing *Bignonia capreolata*, *Campsip grandiflora* (*Tecoma grandiflora*), and *C. radicans* (*T. radicans*) in the same genus, the Committee has accomplished the feat of uniting two genera separated by Jussieu in 1789, and placed by all botanists nowadays in different tribes. The compilers doubtless selected the name *Bignonia capreolata* from the first edition of Britton and Brown's "Illustrated Flora," and *Bignonia radicans* from the second edition, overlooking the fact that Britton had applied the name *Bignonia* to different genera in the two editions. A knowledge of nomenclature would have been helpful in this case.

The absence of authors' names for the species is a serious defect. Thus the statement that *Trifolium minus*, "Shamrock," is a horticultural variety of *T. repens* is at first sight somewhat mystifying. Reference to Bailey's Cyclopedia, however, shows that what is really meant is not *T. minus* Sm. but the plant erroneously catalogued by American nurserymen as "*T. minus*."

So-called "common names" have been manufactured by the hundred. Many are bald translations of the scientific names, such as "American Beautyberry" for *Callicarpa americana*, which as a matter of fact already possesses a common name, "French Mulberry." "Indian Shot" is rejected in favour of "Canna," "Silk-Cotton-Tree" is superseded by "Ceiba," "Mezereon" is disguised as "February Daphne," and *Azalea amoena* becomes "Amoena Azalea"—how can the latter be called a common name? *Heliopsis scabra* var. *sinniæflora* is turned into "Zinnia Heliopsis," which is liable to be taken for a species of *Zinnia*. *Dracaena* and *Spiraea* are transformed into "common names" by being mis-

spelt "Dracena" and "Spirea" respectively. But the gem of the collection is "Maplewort," which is evidently intended as a translation of *Aceranthus*. The latter name has, of course, no connection with *Acer*, but was derived from $\kappa\epsilon\pi\alpha$, expressing want or absence, $\kappa\epsilon\pi\alpha$, a horn, and $\kappa\epsilon\theta\sigma$, a flower, in allusion to the spurless condition of the petals, which distinguishes the genus from *Epimedium*.

The failure of the American Code to obtain acceptance among horticulturists in the United States is clearly demonstrated by a perusal of "Standardized Plant Names." In a great majority of cases generic names which are conserved under the International Rules and rejected under the American Code are retained—e.g. *Agapanthus*, *Ardisia*, *Calceolaria*, *Callistephus*, *Corydalis*, *Ixia*, etc. The Grasses are, however, named in accordance with the Code, and in many of the families the names appear to have been selected quite arbitrarily. The book will doubtless be useful to American nurserymen and their customers as a checklist of plants offered for sale in the United States, thus fulfilling the purpose for which it was prepared. As a guide to the correct names of cultivated plants it will prove a broken reed. The title is misleading: it should have been "American Horticultural Names."

"A Manual for Spraying." By K. L. Cockerham. xi + 87 pp. 8vo. (Macmillan, New York, 1923.) 7s. net.

This is a summary of methods of dealing with pests, and of recipes for sprays, and the author says: "It is my desire that this book may be found of some value as a reference guide or handbook for the gardener, fruit-grower, farmer or student, and if in a small way it does answer such a purpose I shall feel amply repaid for the time I have spent in compiling this data" (*sic*).

Troubled with apple scab, the grower is referred to p. 66, where the injury is described as "olive or brown spots," and the treatment "lime-sulphur or bordeaux." He turns then to p. 21, where some remarks are made on Bordeaux Mixture. It is wrongly defined as "a solution of CuSO_4 mixed with milk of lime in which $\text{Cu}(\text{OH})_2$ is precipitated," and an inaccurate formula is given for the chemical reaction that takes place when it is made. Some other inaccuracies or loose statements lead up to the warning: "The liquid should be thoroughly tested for excess of CuSO_4 and $\text{Cu}(\text{OH})_2$." The farmer is not told how to test for these chemicals. The preparation is given as:

Copper sulphate	4 lb.
Stone lime	4 lb.
Water	50 gallons.

"A milk of lime should be prepared and diluted with the 50 gallons water. Then the dissolved copper sulphate should be diluted with it. Agitate thoroughly."

That is all. No other warnings are given. Nothing is said concerning the time or method of applying it. Comment seems needless.

"Soils: their Properties and Management." By T. L. Lyon, E. O. Fippin, H. O. Buckman. xxi + 764 pp. 8vo. (Macmillan, New York.) 15s. net.

This is a book for students, and it can be thoroughly recommended to those who are prepared to study carefully the factors of importance in the making of soils and in soil fertility, and at the same time the influence exerted by these factors in different types of soil. The illustrations are drawn mainly from American sources, and the book is in only a small degree a book for reading.

"The Principles of Insect Control." By R. A. Wardle and P. Buckle. xiv + 295 pp. 32 figs. (The University Press, Manchester; Longmans, Green & Co., London, 1923.) 20s. net.

This book is unique in that it is the first time that an author has attempted to deal entirely with the question of insect control. A complete digest has been made of the numerous methods employed against pests.

The arrangement is to divide the volume into four parts:—(1) biological control; (2) chemical control; (3) mechanical control; and (4) legislative control.

Part I. deals with such matters as host resistance, climatic restraints, disease, parasites and predators, and bird encouragement.

Part II. discusses the question of insecticides, dips and dressings, attractants and repellants, and fumigants.

Part III. includes cultural methods of control, restriction of spread, crop storage, and baits and traps. The final section deals entirely with legislation.

An appendix includes the various types of spraying and dusting machinery, and twenty-six pages of bibliography, arranged under chapter headings.

Great strides have been made during the last twenty years in the study of entomology, but most of the published work has been confined to descriptions of insects, with but scanty notes on remedial and preventive measures, and hackneyed phrases on parasite-introduction. This book has meant untold work on the part of the authors by the perusal of literature from all parts of the world, especially America, which deals with insect pests.

It is a book that should be in the library of every economic entomologist, and should prove of real value to the intelligent farmer or gardener who realizes that the presence of an insect pest on his crops means loss of profit.

"*Fungi : Ascomycetes, Ustilaginales, Uredinales.*" By Dame Helen Gwynne-Vaughan. Large 8vo. xi + 232 pp. (University Press, Cambridge, 1922.) 35s. net.

This is an account of some of the main divisions of the fungi, showing the forms they take up, and discussing some of the peculiarities of their life histories. It is well printed and illustrated, and students will find in it an excellent review of the present position of knowledge regarding these minute plants.

"*Manual of Cultivated Plants.*" By L. H. Bailey. 8vo. 851 pp. (Macmillan, New York, 1924.) 31s. 6d. net.

No one has attempted a "Flora for the identification of the most common or significant species of plants grown in the continental United States and Canada for food, ornament, utility, and general interest, both in the open and under glass," nor for any other country. Professor Bailey is, therefore, to be congratulated on breaking new ground, and very useful ground too. The flora is on the lines of Bentham and Hooker's "British Flora," but deals, not with the native flora, but with the flora of gardens. Only a little over 3,000 species are described, but this is sufficient for all but the specialist, who must look elsewhere for similar descriptions.

Doubtless the fact that the flora of American gardens is being dealt with accounts for some of its main limitations. The genus *Saxifraga*, for instance, which looms so large in the eyes of the English rock gardener, has only five species described, and *Primula* but seventeen (eight greenhouse species). *Campanula* is better off with twenty-three, *Gilia* with ten, and *Phlox* with twelve. It is thus a book largely for the information and use of the beginner, not for the specialist, but it is none the less useful for that.

It is well and clearly printed, and the proof-reading has been excellent. A few words new to English readers are used, such as 'cultigen' and 'cultivar,' but all such are defined.

"*Border Carnations and Cloves.*" By J. Douglas. 8vo. 31 pp. ("Country Life," London, 1921.) Paper covers, 9d. net.

The name of Mr. James Douglas on the title-page is sufficient guarantee of the accuracy and value of this book. Border Carnations have perhaps been neglected by gardeners of late, in favour of the perpetual flowering varieties, but it is doubtful whether the true florist will ever let the newer comers oust the clean cut, sweet scented, hardy border varieties that have been favourites so long. No one has done more than Mr. Douglas, and his late father, to foster them, nor given us better varieties, and no one could be a better guide to their good care than the author of this little book.

"*The Rose in America.*" By J. Horace McFarlane. 8vo. 233 pp., with many illustrations. (Macmillan, New York and London, 1923.) 12s. 6d.

This book is admirably printed in clear type and is well got up. There is always a certain interest in noticing how a master of his subject in another land will treat a theme that may here be well worn, and in this respect Mr. McFarlane's book is not disappointing.

The details of rose culture in America differ but little from those found to be successful here; in both countries, in the artificial conditions under which roses are grown, personal care and attention are the chief requisites to the production of good flowers, or, as our author puts it, "You must be Johnny-on-the-spot all the time." The rose nursery trade of America is, however, to a much greater extent than in this country concerned with rose growing under glass, and the author suggests that out-door cultivation of roses in cottage gardens is not so common as it is with us, and as he would like to see it in America.

Very interesting is his account of the use made in America of roses of the hybrid *Wichuraiana* type for covering railway banks, presumably, apart from

their decorative display, to assist in retaining the soil in position by their roots, a practice which it would be interesting to see tried in this country.

Our author divides roses into "usual" and "unusual" roses, including in "usual" roses all the garden hybrids of the tea, Wichuraiana and multiflora forms, and in "unusual" roses those we are accustomed to describe as rose species, i.e. different varieties of wild roses and their hybrids such as *R. Hugonis*, etc.

His account of the great variety of soils to be found in America in which the rose will flourish is of considerable interest in showing what an accommodating plant the rose is; and this is accentuated if the great differences in climate are considered that exist between many parts of Canada, where the rose will do well in spite of the cold, and the south of Florida, where the tea roses are almost perpetual. The different climates that obtain over the United States are illustrated by a Rose Zone map, and it is not surprising to find a long discussion on "Wintering roses anywhere," in which the methods that may be practised to protect the plants from severe weather are carefully considered.

The book is illustrated by pictures in colour and in sepia, the latter being the most pleasing, the coloured pictures being rather hard and, though doubtless giving some idea of the effect of the flowers, artistically somewhat crude.

"Roses and how to excel with them." By R. V. Giffard Woolley. 8vo. 119 pp. (The "Country Life" Library, London, 1923.) 2s. 6d.

This is a pleasantly written little book, and contains much useful information. It offers a number of designs for rose gardens of various sizes and illustrations of methods of pruning and propagation, and gives all the instruction necessary for the usual routine of rose culture.

At a time when so many new houses are springing up in the suburbs of London and other towns, each involving the laying out a new garden, the author's designs for small gardens should be appreciated. He is no doubt right in recommending turf as the best set-off for rose beds, and in restricting each bed to one variety. His view that the beds of polyantha pompons should be associated together in formal beds away from the rose garden proper is also to be commended, for these varieties always seem a little out of place between beds of H. T. roses.

The author does not give any great assistance as to the varieties to be employed in filling his beds, but at the end of his book there is a long list of varieties, approaching 500 in number, with short descriptions, from which no doubt selection can be made. He indicates, however, the varieties suitable for pergolas, hedges, banks, etc., and has a short chapter on a few of the most useful rose species. In these days of dear books the price at which this little work is sold should be an attraction to many beginners in gardening.

"The Banana: its Cultivation, Distribution and Commercial Uses." By W. Fawcett. Ed. 2. 8vo. xi + 299 pp. (Duckworth, London, 1921.) 15s. net.

First published in 1913, a second edition of this comprehensive book upon the banana and its cultivation has quickly been called for, and the opportunity so afforded has been used to bring it up to date.

"The Micro-organisms of the Soil." By Sir E. John Russell, F.R.S., and members of the Biological Staff of the Rothamsted Experimental Station. 8vo. vii + 188 pp. (Longmans, Green, London, 1923.) 7s. 6d. net.

One of "The Rothamsted Monographs on Agricultural Science," this book is the outcome of a series of lectures given recently at University College, London, by members of the Rothamsted staff. As fuller accounts of each section are announced to be in preparation, it will suffice to indicate the nature of the contents of this volume, which will serve as a general introduction to the matter. The ten chapters deal with (1) Development of the Idea of a Soil Population, by Sir John Russell; (2) Bacteria in Soil (chaps. 2, 3), by H. G. Thornton; (3) Protozoa in Soil (chaps. 4, 5), by D. W. Cutler; (4) Soil Algae (chap. 6), by Dr. Bristol; (5) Soil Fungi (chaps. 7, 8), by Dr. Brierley; (6) The Invertebrate Fauna of the Soil (other than Protozoa) (chap. 9) by Dr. Imms; Chemical Activities of the Soil Population and their Relation to the Growing Plant (chap. 10), by Sir John Russell.

Much of our knowledge of the living population of the soil is recent, and the influence of one kind of organism upon the activity of others has proved to be one throwing a great deal of light upon the phenomena long since observed among plants.

"Plant and Flower Forms: Studies of Typical Forms of Plants and Plant Organs." By E. J. G. Kirkwood, B.Sc. La. 8vo. xvi + 80 pp. (Sidgwick & Jackson, London, 1923.) 7s. 6d. net.

Thirty-nine pages of excellent outline drawings of common flowering plants and one of bees, with dissections such as can be made with the aid of a pocket lens and notes, constitute this book. The author believes that with the drawings and the actual specimen in hand students' powers of observation will be quickened and their grasp of plant structures strengthened. Whether this be so or not will depend in great measure upon the teacher; such an aid will doubtless benefit the earnest student, but may well tend to lessen rather than increase the observing powers of the lazy one. The drawings themselves are a pleasure to examine and a pattern to follow.

"Diseases of Truck Crops and their Control." By J. J. Tanbenhaus. xxxi + 396 pp. (Dalton, New York, [1918].)

American, of course, as the use of the word "truck" indicates, and therefore including several market-garden crops unusual in this country, but a good book for the grower. A very useful feature of the book is the number of excellent illustrations. These are for the most part from photographs and are excellently reproduced. The remedial and preventive measures are briefly and clearly detailed, and less unnecessary detail regarding the fungus which causes the disease is included than is frequently the case.

"A Vegetable Grower's Handbook." By Mrs. F. Bennett and E. S. Rohde. 8vo. x + 174 pp. (Hopkinson, London, 1923.) 2s. 6d. net.

This little book is full of useful information upon vegetable growing, and we can heartily recommend it, so far as cultural details go. A better guide as to varieties to plant will be found in the "Reports of the Wisley Trials," published in our JOURNAL. It seems, for instance, strangely difficult for writers to bring themselves to advocate any onion for autumn sowing outside the soft non-keeping Roccas and Tripolis, yet there are many suitable onions with long-keeping qualities.

"Life." By Sir Arthur E. Shipley, G.B.E., F.R.S. 8vo. 204 pp. (Cambridge University Press, 1923.) 6s. net.

This book deals with life in general, and a portion is naturally devoted to animals. It is, however, very useful for horticulturists to take a wider view now and then, and we do not know any simple book in which this can be better found. The life of the plant and its reactions to the soil and light are simply treated. A peculiarly interesting chapter is that upon rhythm, and it is remarkable to read that there may be some justification for the old idea of lunar influence upon animals at least, and the writer suggests that its proved effect upon sea urchins of the Mediterranean may well have started this curious belief. The book is throughout written in a simple style and not without some flashes of humour. It is one of the great discoveries of the present age that solemnity and wisdom may be occasionally divorced.

"Life of the Wayside and Woodland: When, Where, and What to Observe and Collect." By T. A. Coward. 8vo. viii + 216 pp. (Warne, London, 1923.)

This well written, illustrated and printed volume is an excellent book for any young naturalist who has not yet specialized in his hobby. With so wide a subject, nearly all the animal and plant life of Britain to speak about and deal with in six sections during the year, the author has had no opportunity of describing the objects mentioned; that had to be left to other writers whose books are set forth. The author especially emphasises the need of observing and noting; he admits that judicious collecting and preserving are essential to the naturalist, but he deprecates the wholesale captures indulged in by collectors. Mr. Coward is an expert ornithologist, but he has availed himself of friends whose knowledge in other departments supplements his own, so that the advice within the covers of this volume may be trusted.

"British Earthworms and How to Identify Them." By Hilderic Friend. (The Epworth Press.) 1s. 6d. net.

This little volume is a complete monograph of the hitherto discovered British Earthworms. It is chiefly due to the author that the 11 species recorded as

British in 1865 have been increased to a total of 50, exclusive of many varieties. The keys and descriptions are concise and in such simple language that identification should be easy. The numerous illustrations are excellent, and one only regrets that the size of the book does not permit of a chapter on the habits of these much misunderstood and useful animals.

"*Linnæus: The Story of his Life* adapted from the Swedish of Theodor Magnus Fries, Emeritus Professor in the University of Uppsala, and brought down to the present time in the light of recent research." By Benjamin Daydon Jackson. 8vo. xv + 416 pp. (Witherby, London, 1923.) 25s.

The late Professor Fries's monumental "Life of Carl von Linné," the result of more than thirty years of constant research by a botanist born and trained in the atmosphere and nurtured in the traditions of Linnæus, was published in 1903. Dr. Jackson describes his own work as an adaptation, rather than a translation, of the original. Many of the details of persons, places, and things which would need explanation to readers of other than Swedish nationality have been omitted, also many of the original author's notes and references. If Professor Fries was pre-eminently well equipped to write the story of Linné's life, Dr. Jackson was no less fitted to prepare the English edition. For more than forty years he has been actively associated with the conduct of the Linnean Society, first as botanical and later (since 1902) as general secretary, and the study of Linnæus and the Linnean Herbarium and MSS. has largely occupied his leisure. This, his latest contribution to Linnean literature, will be welcomed by English-speaking biologists as an exhaustive account of the life and work of the great naturalist. As a book to read it is in places a little tedious, but as a work of reference it is invaluable.

The first chapter (birth and early education) describes the unconscious struggle of the boy naturalist to evade the destiny mapped out for him by his parents, namely, that he should be a priest. The account of his student years at Uppsala reveals the difficulties under which he worked: not only was he often in need of money, but the conditions at Uppsala and the position of science generally in the Swedish Universities left much to be desired. We learn that during the whole of his student life Linnæus never had the chance of hearing any botanic discourse, either public or private. Those who, judging from the severely systematic character of his best-known writings, imagine Linnæus as the dry-as-dust taxonomist will be enlightened by the story of his student days. He was a keen field naturalist, observing plants, animals, rocks, and minerals, and carefully recording, collating, and systematizing the results of his observation. The foundations of several of his important works were laid at this period, and at twenty-four years of age (in 1731) he had completed his "Sexual System." Linnæus was professedly a student of medicine, but opportunities at Uppsala were such that a worse provision for medical teaching could hardly exist. The University had no chemical laboratory; there was an anatomical theatre with seven entrances, but no teacher! "It can only awaken surprise and wonder that almost without guidance Linnæus developed under such conditions into a great man and a pioneer, not only in natural history but also in the domain of pure medicine." He taught botany almost from the beginning of his student's life, giving demonstrations in the botanic garden, private lectures, and conducting excursions. An important incident of this period was his solitary journey to Lapland, the hardships and interest of which are described in detail. The three years spent abroad, mainly in Holland (1735-1738), were a marked contrast with the preceding years of struggle and poverty. Under the patronage of George Clifford at Hartecamp he worked quietly and zealously, and had the satisfaction of completing and publishing his earlier works and of writing many others, among which was the sumptuous "*Hortus Cliffortianus*," which was written within nine months. "His books which bear the date of 1737 consist of nearly 500 pages in large folio, and more than 1350 pages in octavo with 46 plates." His stay in Holland was broken by a short visit to England, where he met Sir Hans Sloane, Philip Miller at Chelsea, and Dillenius at Oxford. Though he left Holland with his reputation as a botanist established, there was no botanical opening for him in Sweden, and in 1738 he settled in Stockholm as a practising physician, and achieved considerable success. Three years later he writes: "Through the grace of God, I am being now freed from the wretched practice in Stockholm. I have obtained the post which I have so long desired; the King has appointed me Professor of Medicine and Botany at the University of Uppsala, and thereby again given me to Botany, from which I have been exiled for three years. Should life and health be vouchsafed to me, you will I hope now see me perform something noteworthy in botany."

Hereafter during more than a third of a century, Uppsala became, through Linnæus's activity, the centre for the study of natural history, especially botany. In successive chapters we are given accounts of Linnæus as teacher, as administrator of the botanic garden and museum, as member of the medical faculty, as member of the consistory, and as a private person and in his family relations. The last years of his life were darkened by increasing weakness and disease, and his death in 1778 came as a release from suffering. The story of the disposal of his collections, which after the death of his son in 1783 were purchased by Dr. J. E. Smith at the suggestion of Sir Joseph Banks, is told at some length. The text of the volume ends with a panegyric on the scientific importance of the work of Linnæus. There are several appendices, to which Dr. Jackson has added a short history of Sweden during the lifetime of Linnæus, a select bibliography, and an index.

"Country Life Diary." Ed. by R. Morse. (Letts, London, 1924.) 2s. 6d.

This pocket diary ($4\frac{1}{2} \times 3\frac{1}{2}$ in.) contains numerous Nature Notes prepared for the Selborne Society. It is a calendar with daily spaces for notes, with an account of the Selborne Society and its activities, glossaries, list of medicinal plants, wild plants worth growing, and so on. The Calendar itself is interspersed with notes on various wild animals and insects, with tiny photographs of birds and butterflies.

"Alpine Plants." By A. J. Macself. 8vo. 205 pp. (Butterworth, London, 1923.) 7s. 6d. net.

It is very difficult to judge of the real value of a book upon alpine plants, for so much depends upon how far to go. This contains much good advice for the beginner in the growing of alpine plants, for it is with the cultural side the author is concerned, not with the wide subject the title of the book might indicate. The most mature cultivator is less likely to find anything to stimulate him or give him fresh ideas. Even the beginner is left in the lurch at times. For instance, Sedums are named and praised more than once, but not once—or at least only once—is any particular species referred to by name—and that *Sedum coeruleum*. For the rest the reader is referred to catalogues. Well and good, but better would it have been if he could have been warned of the all-pervading tendency of some species—*S. hispanicum* or *S. reflexum* for example; better, too, if he had been advised of the especial beauty of *S. lydium*, *S. spathulifolium purpureum*, and a few others; and if he had also been warned of the tenderness of *S. humifusum* and *S. Stahlii*. It is a pity too to leave the impression, as is done here, that all Sedums thrive with a modicum of soil—some in fact are the better for bog conditions. And let no one starve the beautiful *S. spectabile*!

Why is *Lewisia rediviva* singled out for mention among all the members of this genus—many of them more beautiful and more apt to repay their cultivator by making themselves at home? Why is *Primula Winieri* forgotten and *Lotus corniculatus* included? The latter and *Asperula odorata* should surely have been put into an Index Expurgatorius where small rock gardens are in question.

"Genetics: An Introduction to the Study of Heredity." By H. E. Walter. Rev. ed. 8vo. xvi + 354 pp. (Macmillan, New York, 1922.)

This book was noticed in our JOURNAL, vol. 39, on its first publication in 1912. It is now revised in the light of more recent work, and contains three new chapters: one on the architecture of the germplasm, dealing especially with the structure of the nucleus and behaviour of the chromosomes, another on somatogenesis, and a third on the determination of sex.

"Meteorology: an Introductory Treatise." By A. M. Geddes, M.A., D.Sc. 8vo. xx + 390 pp. (Blackie, London, 1921.) 21s. net.

"Agricultural Meteorology: the Effect of Weather on Crops." By J. Warren Smith. 8vo. xxiv + 304 pp. (Macmillan, New York, 1920.) 13s. net.

The former of these books is about half as large again as the latter. Both are well printed and illustrated, and the coloured illustrations of the former are particularly good.

The former deals more with meteorology proper, the latter discusses that and the effect of climate on crops. The former is therefore the more complete so far as the science of meteorology is concerned, the latter deals with crops from

the American point of view and is therefore less interesting to the British grower than it might be if applying to British conditions. The account of recording instruments is more complete in the former book, and in both methods of using data, of making correlation tables, and constructing curves are discussed fully and clearly.

We recommend both to the notice of readers who are interested in weather recording.

"The Complete Amateur Gardener." By H. H. Thomas. 8vo. xiv + 513 pp. Coloured frontispiece and 96 full-page plates. (Cassell, London, 1924.) 16s. net.

The complaint is frequently made, and on good grounds, that such and such a gardening book tells one what one already knows but never throws any light upon the point about which information is required. The author claims that this book is not one of that type, but that in its pages the amateur gardener will find that his every question has been anticipated and a helpful answer supplied. As the aim of the book is "to provide a reliable guide to the making and maintaining of a garden and to the cultivation of all trees, shrubs, flowering plants, bulbs, fruits, vegetables, and greenhouse plants in which amateurs are likely to be interested," the claim is a great one, but we think that the average amateur will agree that the author has gone a very long way towards justifying it.

The book is divided into sections dealing with "Making and Managing the Garden," "The Flower Garden," "Ornamental Trees and Shrubs," "Methods of Propagation," "The Amateur's Greenhouse," "Fruit and Vegetable Garden," "Manures, Pests and Diseases," and a good index is provided so that information may be obtained without undue searching.

The section dealing with the flower garden is the longest and consequently the most thorough. Generally the information is sound, but we cannot agree with the author that shallow water is the best place for *Iris foetidissima*, or that *Iris Kaempferi* does better there than by the waterside. A rather serious error in figures occurs on p. 140 where directions are given for the destruction of green scum on ponds by the use of copper sulphate at the rate of 1 lb. to 1,000 gallons of water. The use of such a large amount of copper sulphate is fraught with the greatest danger to both fish and cultivated water plants. Moreover, it is wasteful of material and labour, for $\frac{1}{2}$ ounce is sufficient for 1,000 gallons.

In the section dealing with trees and shrubs information regarding the time of flowering, method of pruning, etc., is given in a series of tables, a column being provided in each case for the so-called popular names. Many of these non-botanical names appear to be creations of the author, for we have never heard them used, and in some cases he seems to have forgotten them as soon as he had invented them, for in a number of instances a plant has one non-botanical name on one page and another on the next. And this is not to be wondered at, for the names are not brief, nor have they any meaning. How could he be expected to remember which plant he had christened "The New Zealand Shrubby Veronica" when there are a score of New Zealand Shrubby Veronicas cultivated in gardens?

Fruits, both in the open and under glass, are dealt with rather briefly in forty-one pages, and vegetables are dismissed with only twenty. Both these subjects deserve rather fuller treatment in a book of this type. No mention is made of the self-sterility of fruits, which is a frequent cause of unfruitfulness in small gardens. Facing page 404 there is an illustration of a bush apple tree growing in a grass orchard and we failed to find anything in the text to warn the reader of the inadvisability of planting in grass. The information about stocks for garden trees is out of date. The Broad-leaved English Paradise is given as the stock for all dwarf-trained apple trees, and we are told that "young trees should be lifted and replanted every autumn" in order "to prevent their making very vigorous growth." With our improved knowledge of fruit-tree stocks this should be a thing of the past.

In the chapter on diseases and pests brief particulars are given of the measures for controlling the principal enemies of garden plants. It is not now necessary, as is stated, to notify the Board [*sic*] of Agriculture of outbreaks of either American Gooseberry Mildew or of Silver-leaf. On the other hand, the Ministry should be notified of the occurrence of Onion Smut, which is not, thank goodness! one of the "five common diseases" of onions.

The book is freely illustrated with excellent plates of good plants and scenes in well-known gardens, and in spite of the blemishes and shortcomings which we have mentioned we can heartily recommend it to the many amateur gardeners who require information upon the whole field of gardening condensed into the limits of a single volume.

"The Production of Field Crops: A Text-book of Agronomy." By T. B. Hutcheson and T. K. Wolfe. 8vo. xv + 499 pp. (McGraw Hill Publishing Co., London, 1924.) 17s. 6d. net.

A text-book of American agricultural practice in the raising and harvesting of farm crops.

"Life Movements in Plants." By Sir J. Chunder Bose. Vols. iii. and iv. 8vo. xx + 304 (599-902) pp. (Longmans, Green, London, 1923.) 20s. net.

Dr. Bose continues his ingenious experiments upon plants and describes the apparatus he has devised for his researches. A discussion of geotropism and allied phenomena occupies this book. Here and there evidence of hasty assumptions as well as careless proof-reading mar the work, but the results obtained are invariably interesting and the methods of work suggestive.

"The Flower-Seeker: A Simple Guide to the Identification of Wild Flowers." By Forster Robson. 8vo. viii + 184 pp. (Cassell, London, 1924.) 3s. 6d. net.

The author's claim is simplicity, and his claim is justified. The key, at the beginning, is arranged in two sections—Localities, and Spring and Summer Flowers. These sections are again subdivided into colour, number of petals, and shape, such as Two-lipped for Dead-nettle, Umbrella for Umbelliferæ. After each the number of page is given on which is to be found a concise, simple description. In order to test the merit of the book from the child's point of view, we put it into the hands of a child of nine, with several flowers, and asked her to identify them, which she did with fair accuracy. Great pains have been taken to make the different points clear. There are sixteen excellent photographs and a number of good text illustrations; two pages of leaf-shape illustrations and two of forms of flowers, which should be found very helpful. The book is nicely got up and of convenient size for the pocket.

There is an excellent index of both popular and Latin names. We strongly recommend the book for those with little or no botanical knowledge who wish to identify a considerable number of our commoner native plants.

NOTES AND ABSTRACTS.

[For Index of Periodicals quoted see previous volumes.]

Abies koreana. By S. Mottet (*Rev. Hort.*, vol. xciv. pp. 8-10; 2 figs.).—Several examples of *Abies koreana* described in the *Journ. Arnold Arboretum*, 1920, p. 188, are to be seen in the arboretum of Barres, Verrières and Pézanin. They were raised from seed collected in 1907-8, and are now about six or seven feet in height.—*S. E. W.*

Afforestation, First Work In, by W. Forbes, contains interesting notes on the formation of a home nursery, the formation of seed beds, sowing the seeds, and after-management of the young trees. The table on number of forest tree seeds to a pound weight, and number of seedlings per acre at specified distances apart, are useful, though by no means original. Methods of tree planting are also discussed. "How to combat Injurious Insects," by F. J. Green, treats of the question of dealing with these pests of the woodland, including the insecticides that have been found most useful in their destruction. A clean surface, benefits of insectivorous birds, decoys and traps are all recommended. As regards the pine beetle, which is probably the worst enemy of coniferous trees, it is recommended that burning refuse on the fresh stools has proved effective, while the best traps have proved to be pieces of fresh bark put inner side downwards on the ground and renewed as soon as they get dry. The traps should be frequently examined and the weevils collected and destroyed.—*A. D. W.*

Afforestation of Dartmoor. By W. J. Hale, M.C.—The afforestation of some 5,000 acres is contemplated on the "Forest" of Dartmoor, which covers over 50,000 acres. The area of the proposed afforestation is a heather-clad, boulder-strewn waste, treeless and somewhat wind-swept, but the soil is a fairly good loam, under a dense covering of gorse and heather. The species of trees planted are chiefly soft-woods—Sitka and common spruce, Douglas fir and larch, with shelter belts of beech and sycamore.—*A. D. W.*

Ammonium Sulphate, The Efficiency of, as a Fertilizer. By J. A. Prescott (*Jour. of Agr. Science*, vol. xiii. pt. 3, pp. 333-339).—Field experiments with maize at the Baftim Experimental Station and laboratory tests indicate that the lower efficiency of ammonium sulphate as compared with nitrate of soda is due principally under these special conditions to the liberation of ammonia from the fertilizer in contact with an alkaline soil. The rate of this liberation is a function of the aeration and of the soil reaction.—*A. S.*

Ants, Poison Bait for. By W. B. Gurney (*Agr. Gaz. N.S.W.* vol. xxxiv. p. 256).—A useful poison for ants is prepared by boiling together for half an hour water 9 pints, sugar 9 lb., tartaric acid 6 grams, sodium benzoate 8 grams. When cold add 25 grams of commercial sodium arsenite dissolved in water ($\frac{1}{2}$ pint), and finally 1½ lb. of honey is stirred into the mixture. The bait is placed in tins with loose covers. As it is a slow poison, the ants are able to carry it to their nests and poison the queens and larvæ.—*S. E. W.*

Apple Aphids, The Resistance of Apple Stocks to the Attacks of Green. By A. M. Massee (*Jour. Pomology*, vol. iii. No. 4, Jan. 1924, pp. 191-200; 2 figs.).—An investigation into the resistance of various stocks to the attacks of *Aphis pomi* De Geer. Field experiments were carried over a period of three years, and showed that Paradise stocks fell into the following groups: (1) Apparently immune—one stock of type ix ('Jaune de Metz'); (2) resistant—type ix ('Jaune de Metz') and type v ('Doucin Amélioré'); and (3) susceptible—type ii ('Doucin'), type i ('Broad-leaved English Paradise'), type iii ('Holly-leaf'), type x (unnamed), 'Northern Spy' and 'Crab A.'

All stocks were grown under similar conditions, and frequent and heavy infections were made.

The effect of grafting susceptible varieties on apparently resistant varieties showed no promise that stock resistance is transmitted to the scion.

Preliminary experiments were made as to the effect of three different soils on stock resistance, with the result that possible correlation exists between growth at a particular period and resistance. The causes of resistance are not apparent, although degrees of resistance are real. Tables are given showing (1) percentage of stools attacked during 1921, 1922, and 1923; (2) types of stock, and the number attacked after first, third, and fifth infections; and (3) degrees of resistance of the same varieties of stocks to *Aphis pomi* and Woolly aphid (*Eriosoma lanigera* Haus.), with the result that type ix stands out as being resistant to both pests.—G. F. W.

Apple Blossom Weevil (Anthonomus pomorum Linn.), Observations on the Bionomics of the. By H. W. Miles (*Ann. App. Biol.* vol. x. Nos. 3 and 4, Dec. 1923, pp. 348-369; 11 figs., 2 plates).—An investigation carried out partly in the Pershore district of Worcestershire and partly at Long Ashton experimental station, Bristol. This species has a wide distribution, and is found in most European countries and the United States.

The life-history is given, together with descriptions of the male and female adults, pupal, larval and oval stages.

The internal anatomy of the adult is described and figured.

Host trees include apple, crab-apple, and pear. The factors determining extent of damage are:

(1) Climatic conditions—a protracted and checked blossom-bud development, caused by cold and dull spells of weather, gives the weevils a considerably lengthened ovipositing period.

(2) Natural enemies include birds—e.g. woodpecker, various species of tits, sparrows, and nuthatch; insects—e.g. *Haplothrips tritici* Kurd. (a predacious thrips), ten species of parasitic Hymenoptera, of which *Pimpla pomorum* Ratz is the commonest; and fungi, a species of *Isaria* being implicated.

At Long Ashton the parasitism of *Pimpla pomorum* accounted for 5 per cent. mortality in the larval stage, and *Isaria* for about 4 per cent. mortality of the adults.—G. F. W.

Apple Blotch in Indiana. By Max W. Gardner (*U.S.A. Hort. Soc., Indiana*, vol. vi. No. 1, Jan. 1924).—This bulletin gives some of the more recent developments in the knowledge and treatment of this disease, which causes large black blotches on the fruit, thereby stunting, deforming and cracking it. Varieties which canker badly are specially susceptible to it, as the fungus persists from year to year in the cankers, but very few varieties appear to be immune. The blotch lesions are produced by the growth of the mycelium of *Phyllosticta solitaria*, E. and E., within the tissue just under the epidermis, appearing on twigs, water sprouts, suckers, and even on the bud scales, leaves, and fruit stems. The fungus penetrates only about half-way to the cambium, and the darkened infected tissue can be shoved off without any injury to the underlying cambium, and some advocate eradication of the disease in this way. It can be controlled by summer spraying with Bordeaux, lime sulphur being less effective. Spraying should be done soon after the fall of the petals, and three times afterwards at intervals of a fortnight.—A. P.

Apple Seeds, Respiration of. By Geo. T. Harrington (*Jour. Agri. Research*, vol. xxiii. No. 2, Jan. 1923, pp. 117-130).—The respiration of dormant apple seeds is low, but the intensity in seeds capable of germination is higher and increases with advancing germination. The removal of the seed coats increases respiratory intensity and aids germination. The respiratory quotient increases with increased temperature and causes shortage in easily oxidizable substances in the tissues. It decreases with decreased temperature, and this indicates a storage of oxygen and leads to increases in the acids and sugars at 0° C. and 10° C. Correlated with a relatively high temperature is high rate of oxidation and a tendency for the seeds to become more dormant. But with a storage of oxygen at low temperatures they slowly become capable of germination. Temporary elevation of the temperature (to 30° C.) may exert a stimulating effect on the respiration of dormant apple seeds. Respiratory intensity, respiratory quotients, and temperature coefficients are all affected by previous treatment of the seeds. The temperature coefficients are different for the different steps in respiration, and these are related to different temperature effects upon the physiological condition of the living embryo.—A. B.

Apple Seeds, Ripening and Germination of. By Geo. T. Harrington and B. C. Hite (*Jour. Agri. Research*, vol. xxiii. No. 3, Jan. 1923, pp. 153-161).—When first matured apple seeds are unable to germinate, and even during storage and normal conditions it is difficult to cause them to germinate. Nurserymen place the seeds in sand and put outdoors over the winter to bring about germination in the following spring. The dormancy is in the embryo itself.

Apple seeds, however, acquire the power of germination if kept moist at temperature from 5° C. to 10° C. If they become dry they seldom germinate. The removal of the seed coat has no apparent effect upon completely dormant apple seeds, but it accelerates the germination of after-ripened seeds.—A. B.

Apple Sting, Codling Moth responsible for. By J. J. Davis and B. A. Porter (*U.S.A. Hort. Soc., Indiana*, vol. vi. No. 1, Jan. 1924).—The injury is represented by a small cavity, sometimes not much larger than a pin point, surrounded by a discoloured area up to a quarter of an inch in diameter. It is largely, if not entirely, caused by the larva when recently hatched.—A. P.

Apples, Summer Pruning. By J. A. Neilson (*Report Minnesota State Hort. Soc.* vol. 1. pp. 148-150).—(1) Eight years' observation on pruning five- or six-year-old apple trees showed that summer pruning does not hasten fruit bearing; (2) summer-pruned trees make less growth than dormant-pruned trees; (3) unpruned trees make more growth and bear heavier crops than pruned. These results are opposed to prevalent views on pruning.—S. E. W.

Asclepias mexicana (the Mexican Whorled Milkweed) as a Poisonous Plant. By C. D. Marsh and A. B. Clawson (*U.S.A. Dep. Agr., Bull.* 969, Oct. 1921; 2 plates, 1 fig., 7 tables).—This bulletin details the results of nineteen feeding experiments with this weed on sheep, to which it is regarded as particularly dangerous. The lethal dose is six times that of *A. galloides* and about one-half that of *A. pumila*.—A. P.

Avocado. By W. T. Pope (*Hawaii Agr. Exp. Sta.* 1921, pp. 9-12; 1 plate).—The Avocado (*Persea americana*) requires a well-drained rich soil, with a plentiful supply of water during the dry season and protection from strong winds. Failing these conditions the young trees frequently die, just as they are coming into bearing.—S. E. W.

Azotobacter, A Growth-producing Substance produced by. By O. W. Hunter (*Jour. Agri. Research*, vol. xxiii. No. 10, March 1923, pp. 825-832).—The author finds that the Azotobacter can synthesize a food accessory factor similar to water-soluble B, and that this food accessory factor stimulates a greater gain in animals and birds than baker's yeast.—A. B.

Azotobacter, Growth of, by Aeration. By O. W. Hunter (*Jour. Agri. Research*, vol. xxiii, No. 8, Feb. 1923, pp. 665-677).—A prompt and vigorous growth of Azotobacter can be induced in large quantities of liquid medium by sufficient aeration, and this aeration stimulates rapid nitrogen fixation by Azotobacter. A close relationship exists between the rate of dextrose fermentation and nitrogen fixation, and it was found that calcium carbonate is not essential in a medium used for aerating pure cultures of Azotobacter.—A. B.

Azotobacter, Life History of. By F. Löhnis and N. R. Smith (*Jour. Agri. Research*, vol. xxiii. No. 6, Feb. 1923, pp. 401-432; 9 plates).—The authors show that the genus Azotobacter is characterized by seven different cell types as follows: (1) Large non-sporulating oval cell with flagella; (2) coccoid cells resembling *Micrococcus concentricus*, *M. sulfureus*, *M. roseus*; (3) dwarf cell type from gonia; (4) irregular fungoid cells apparently related to *Mycobacterium album*; (5) small non-sporulating rods similar to *B. lactis viscosum*; (6) small sporulating rods resembling *B. terminalis*; and (7) large sporulating cells similar to *B. luteus*. All these types passed into each other. The reproductive processes of Azotobacter are gonia, exospores, arthrospheres, microcysts, and endospores.

The authors hold that the different developmental stages of Azotobacter could be in part identified with certain species of the genera *Micrococcus*, *Bacterium*, *Pseudomonas*, *Bacillus*, and *Mycobacterium*, and show conclusively that the whole system of bacteria requires complete revision, which must be based upon a thorough examination of the life-histories of the bacteria.

They are convinced that these changes are not due to accidental contaminations of the cultures studied, but are the normal changes in the life-cycle of Azotobacter.—A. B.

Bacteria in Soil, Determination of the Number of. By C. L. Whittles (*Jour. of Agr. Science*, vol. xiii. pt. 1, Jan. 1923, pp. 18-48).—The usual shaking methods have been examined and found unsatisfactory. A method has been evolved for the estimation of the number of soil organisms by a direct count, and the numbers found to be very much higher than any previously reported. A method for the disintegration and dispersion of the soil particles and bacteria has been devised, by means of which plate counts were made which were comparable with direct counts. The dispersive actions of shaking and of vibrating have been compared. The former was found to give results which depended on the moisture content of the soil, whereas the trembling motion gave results in which the effect due to the moisture content was not apparent.—A. S.

Bacteria in Soil, Determination of the Number of. By H. G. Thornton (*Jour. of Agr. Science*, vol. xiii. pt. 3, July 1923, pp. 352-353).—The article by C. L. Whittles on this subject in *Jour. of Agr. Science*, vol. xiii. pt. 1, p. 18, is criticized. It is pointed out that the figures given by Whittles are faulty and indicate that the technique, in its present state of development, contains defects that render it valueless for the purpose of bacterial analysis.

A. S.

Banana Aphis. By W. W. Frogatt (*Agr. Gaz. N.S.W.* vol. xxxiv. pp. 296, 297; 1 fig.).—It is doubtful whether the Banana Aphis (*Pentalonia nigronervosa*) is the direct cause of bunchy top in Bananas.—S. E. W.

Bean Weevil. By R. H. Pettit (*Agr. Exp. Stn. Mich.* vol. vi. pp. 20, 21).—Bean Weevils are easily destroyed in bins or casks by pouring into a suitable receptacle placed on the top of the beans 2 drams of carbon disulphide per cubic foot of space. The bin is then tightly closed.—S. E. W.

Blueberry Cultivation. By F. V. Coville (*U.S. Dep. Agr., Bull.* 974, pp. 1-24; 29 plates).—The Blueberry (*Vaccinium corymbosum*) thrives in sandy, peaty soil, which is worthless for ordinary agriculture owing to its acidity. Good drainage and moderate soil moisture are requisite, also absence of lime. As the roots are provided with a fungus which supplies them with nitrogen, farmyard manure is not required. The shrubs are propagated by budding or stumping. The latter operation is effected in spring by cutting the stems down to the ground and covering the stumps to the depth of three inches with sand mixed with half or a quarter its bulk of sifted peat; which must be kept moist. The bed is opened in the following spring; the rooted shoots severed from the stump and transferred to a bed of rotten peat, mixed with half its bulk of sand, in a cold frame. The most up-to-date mode of propagation is by "tuberizing." This consists of placing dormant cuttings horizontally on a bed of sand and covering with a layer of sand and peat to a depth of three-quarters of an inch. Moisten with rain water and cover with sheets of glass. Keep at a temperature between 55° and 65° F. After some weeks rooted cuttings are formed. The cuttings are potted up in a compost composed of peat (9), sand (1), and broken crocks (3); no loam or manure is added. The field planting of the one- or two-year-old cuttings takes place in autumn. The fruit from flowers pollinated from the same bush or bushes raised from the same parent is smaller than the fruit obtained by the pollination of non-related stocks. A plantation should consist of cuttings from several non-related bushes. A dressing with a mixture of sodium nitrate (17), dried blood (23), steamed bones (34), calcium phosphate (34), and potash (17 lb.), in the proportion of 1 lb. to 8 square yards, is beneficial. Instead of pruning, the bushes may be burned in the dormant season. Hybrids with large berries are now raised.—S. E. W.

Blue Nymphaea. By F. Laplace (*Rev. Hort.*, vol. xciv. pp. 10-12; 2 figs.).—The Blue Nymphaea may be flowered in summer in shallow ponds, if treated as an annual. The seed is sown in autumn in pots nearly filled with a mixture of loam and well-rotted manure (2:1) and is covered with fine sand. The pots stand in water at 77°-80° F., leaving the surface covered to a depth of half an inch. Every care must be taken to avoid damage to the roots when the seedlings are pricked out. Frequent repotting is desirable; the depth of water above the surface is slightly increased after each operation. In June the clumps are transferred to osier or wire baskets and placed in position in the pond.—S. E. W.

Borax, Effect on Crops. By J. J. Skinner, B. E. Brown, and F. R. Reid. (*U.S. Dep. Agr., Bull.* 1126, pp. 1-30; 11 plates).—A certain brand of potassium chloride used as a fertilizer in the United States contains as much as 6·25 per cent. of borax. Borax is injurious to plant growth, especially when drilled

in the furrow immediately before planting. In wet seasons it does less damage, as it is washed out of the soil. Beans, maize, and cotton are damaged by small quantities, but potatos are not injured by 5 lb. of borax to the acre.—*S. E. W.*

Butia capitata var. delicosa. By A. R. Proschowsky (*Rev. Hort.* vol. xciv. p. 39).—Butias are fairly hardy and may be grown in tubs or pots and wintered in a cold house, as they can resist a temperature of -5° F. By careful selection a variety has been obtained free from fibre and having a delicious flavour. It is named *delicosa*. This variety flowers in June and the fruit ripens in the beginning of September.—*S. E. W.*

Cabbages in Winter. By C. Potrat (*Rev. Hort.* vol. xcv. pp. 474–476).—To ensure a supply of cabbages in very cold districts through the winter, take up the plants in the middle of November and replant in a horizontal position on the edge of a shallow trench running east and west. The heads face north and find shelter in the trench; or the cabbage may be planted horizontally in the face of a bank with a north aspect. The crop is protected from frost by a covering of straw or by mats.—*S. E. W.*

Campanula calycanthema f.p. By L. Lille (*Rev. Hort.* vol. xcv. p. 423; 1 fig.).—*Campanula calycanthema fl. pleno*, flowers abundantly in June and July, showing a great variety of colour, from white to lilac, pink, and violet-blue. About 50 per cent. of the plants raised from seed come true.—*S. E. W.*

Canning Crops in New York, An Economic Study of the Production of. By L. J. Norton (*U.S.A. Exp. Sta., Cornell Univ., New York, Bull.* 412, Dec. 1922; 6 figs., 84 tables).—Peas, tomatoes, and sweet corn are dealt with, the author showing the average number of hours' labour required for the various operations of growing and harvesting, and the average cost of these and other factors in production, thus working up to the average cost per acre.—*A. P.*

Cattleya 'Souvenir de Mme. A. Lecler.' By A. Marcoz (*Rev. Hort.* vol. xcv. p. 298; 1 col. plate).—The beautiful hybrid 'Souvenir de Mme. A. Lecler,' the offspring of *Cattleya 'Jeanne Payet'* and *C. gigas*, has large substantial purple flowers with yellow eyes at the base of the labellum.—*S. E. W.*

Chaulmoogra Tree and some related Species. By Joseph F. Rock (*U.S. Dep. Agr.*, Professional Paper, April 1922).—Although chaulmoogra oil has been in use for hundreds of years by the natives of India in the treatment of leprosy, it is only recently that a general public interest has been aroused in it. While it is a fact that it will require a period of several years to demonstrate that persons treated with the acids obtained from chaulmoogra are absolutely cured of leprosy, the indications of their curative action, after nearly two years of use, have been so promising as to make a thorough study of the tree which furnishes this oil, and some closely related products, extremely advisable. The species most used has been *Taraklogenos Kurzii*, which the Burmese call "kalaw," while the fruits are known as "kalawthee." Owing to the insufficient knowledge we possess regarding the trees it is recommended that a thorough survey be made of all the known species.—*A. D. W.*

Clematis Spooneri rosea. By S. Mottet (*Rev. Hort.*, vol. xciv. pp. 213–215; 1 col. plate; 1 fig.).—*Clematis Spooneri rosea*, a hybrid of *C. Spooneri* and *C. montana rubens*, is a great improvement on *C. montana rubens*. It resembles *Spooneri* in growth, but it produces large pink flowers in June.—*S. E. W.*

Conifer Spinning Mite on Sitka Spruce. By Messrs. Cunliffe and Ryle.—This is a brief account of the mite, and the damage it causes, especially to Sitka spruce. A close watch should be kept in nurseries, and affected stocks should be treated immediately. For this purpose soap emulsion, quassianicotine emulsion, and lime-sulphur sprays have been used successfully in Sweden, while 5 per cent. carbolineum has been used on larch in winter. Information as to the prevalence and distribution of this pest will be welcomed by Mr. Ryle, School of Forestry, Oxford.—*A. D. W.*

Cornus Nuttallii. By C. Leroy (*Rev. Hort.* vol. xcv. pp. 497–499; 1 fig.).—The conditions under which *Cornus Nuttallii* will succeed are not yet understood. The tree is hardy but capricious. It likes semi-shade and a moist situation, but it dislikes a soil rich in lime. Sometimes it thrives in what appears to be an unpromising position.—*S. E. W.*

Creosoted Fencing. By W. B. Havelock.—The importance of the use of creosoted home-grown timber for fencing purposes can hardly be over-rated. After being in use for a period of twenty-seven years, only three out of seventy posts in a four-rail fence were unfit to be used again, and these three evidently had been unsound when creosoted. The posts were mainly larch and spruce, and the timber was grown, sawn and creosoted on the estate. Some intermediate studs in the fence, made of uncreosoted small larch, are, without exception, quite useless.—A. D. W.

Crop Variation, Studies in.—The Manurial Response of Different Potato Varieties. By R. A. Fisher and W. A. Mackenzie (*Jour. of Agr. Science*, vol. xiii. pt. 3, pp. 311–320).—It is not infrequently assumed that varieties of cultivated plants differ in their response to different manures, and this supposition is often used to explain discrepancies between the results of manurial experiments conducted with different varieties. An account is given of an investigation of the matter, and the authors conclude that there is no significant variation in the response of different varieties of potatos to manure.—A. S.

Cucumbers in Greenhouses. By J. H. Beattie (*U.S. Dep. Agr., Farm. Bull.* 1320, pp. 1–29; 18 figs.).—A greenhouse for the cultivation of cucumbers should be designed to avoid strong draughts and fluctuations in temperature. When the cucumber season is over, the house may be used for raising lettuce and tomatoes.

The soil, preferably loam, is sterilized by steam and enriched by the addition of 30–40 tons of farmyard manure an acre or 1,000–2,000 lb. of artificial fertilizer containing 5 per cent. of nitrogen in the form of dried blood and ammonium sulphate or sodium nitrate, 8 per cent. superphosphate, and 5 per cent. of potash in the form of potassium chloride. Wood ash may be added and acidity of the soil neutralized by the addition of lime.

The benches and the tools used in potting the seedlings are sterilized with formaldehyde. The plants are trained on wire or string trellis and kept at a night temperature of 65°–70° F., and at 75°–85° F. in the day. A mulch of stable manure is given when the plants begin to bear, and plenty of moisture at all times.

As the pollination is performed by bees, large growers keep hives of bees near the houses.

Red spider is kept in check by fumigation, or by spraying with nicotine solution or linseed oil emulsion. For white fly, fumigate with hydrocyanic acid (1 oz. sodium cyanide, 1½ fluid oz. sulphuric acid, and 2 fluid oz. water per 4,000 cubic feet). Spray with Bordeaux mixture for anthracnose (*Colletotrichum lagenarium*) and downy mildew (*Pseudoperonospora cubensis*). In case of bacterial wilt (*Bacillus tracheiphilus*) and mosaic, pull up and burn the diseased plants.—S. E. W.

Cultivation of the Oak in Denmark. By L. A. Haugh.—The oak can grow in almost any situation and soil, although it attains its finest growth in the soil where also the beech develops most vigorously. But the oak can also grow in situations and soils where the beech only with difficulty can thrive. In cold, clayey flats fine oak forests may be found, and thus a number of localities are available for the oak where even most of the other hardwood trees cannot grow.—A. D. W.

Douglas Fir in the Pacific North-West, A Study of Decay in. By J. S. Boyce (*U.S. Dep. Agr. Bull.* 1163, July 1923).—The four principal decays in Douglas fir are conk-rot, caused by the ring-scale fungus (*Trametes pini*), red-rot, butt-rot, caused by the velvet-top fungus (*Polyporus Schweinitzii*), brown trunk-rot, caused by the quinine fungus (*Fomes larinis*), and yellow-brown top-rot caused by the rose-coloured Fomes (*Fomes roseus*). Conk-rot and brown trunk-rot usually occur in the body of the trunk, red-brown butt-rot is commonly confined to the stump and first log, while yellow-brown top-rot usually occurs in the upper bole or top. Conk-rot causes by far the greatest volume of decay.

A. D. W.

Douglas Fir. (*Forestry Commission Leaflet No. 8*.)—Douglas fir seed, both home and foreign, has in not a few instances been rendered useless by a grub which feeds on the kernel and completely destroys it. At the present time the only control measure which can be suggested aims at the destruction of the grub in the seed. This can be done by fumigating the seed with carbon bisulphide, using one ounce of the bisulphide to every 100 lbs. of seed, or to every cubic foot of space. The seed to be treated should be placed in an airtight receptacle, the bisulphide

is poured into a saucer placed on top of the seed, and the receptacle closed for forty-eight hours. Before proceeding with the collection of cones on a large scale, it is advisable to gather a small number as samples and to extract and examine the seeds.—*A. D. W.*

Echinops Erytessii multiplex. By J. Roux (*Rev. Hort.* vol. xciv. pp. 29, 30; 1 fig.).—A hybrid of *Echinops Erytessii* and *E. multiplex*, resembles the former in appearance with this important difference, that it bears very open flowers with pink petals and sepals. The tube is yellowish-white.—*S. E. W.*

Egg-killing Washes. By A. H. Lees (*Jour. Pomology*, vol. iii. No. 4, Jan. 1924, pp. 174-178).—Various winter washes were tested as to their efficacy against the eggs of the green apple aphid (*Aphis pomi* De Geer).

Tabulated results show the percentage of hatching on infested branches, after spraying with sulphur compounds, nicotine-caustic soda combinations, and coal-tar products respectively.

Lime sulphur, at the strengths of 1-15, 1-20, and 1-30, was ineffective, but the addition of 0·2 per cent. calcium caseinate gave efficient results when applied in February or March. Nicotine and caustic soda combinations had strong killing power when applied just before hatching. Certain coal-tar products were toxic, but most were useless and some injurious.—*G. F. W.*

Evaporation of Fruits. By J. S. Caldwell (*U.S.A. Dep. Agr., Dep. Bull.* 1141, May 1923; 18 figs.).—This bulletin describes the types of artificially heated evaporators and the methods of handling the various fruits in preparation for drying as well as during the drying process.—*A. P.*

Experimental Sample Plots, by Mark L. Anderson, aims at giving information regarding the behaviour, general health, rate of growth, and volume production of those species which it is considered desirable to plant. Since May 1920, the investigation has been carried on by establishing permanent sample plots in selected woods with the co-operation of owners. The essential feature of a permanent sample plot is that steps are taken to enable measurements of the same area of wood to be made after recurring periods of time—say, every three or five years. Such steps consist of clearly marking the area to be dealt with, numbering the trees with paint, and marking the point on each stem at which the girth measurement is to be made, namely at 4 feet 3 inches from the ground. Anything which adds to our knowledge of the art of thinning must be a decided gain to forestry, and herein lies the value of experimental plots.—*A. D. W.*

Flax Stem Anatomy in relation to Retting. By R. L. Davis (*U.S.A. Dep. Agr., Dep. Bull.* 1185, Oct. 1923; 23 figs.).—The leaf scar test for completion of the retting process is recommended in preference to the method usually adopted, and consists in pulling the girth of cortex away from the wooden core at right angles to the stem, as resistance to separation at the nodes is more marked than elsewhere. The dependability of this test may be increased by supplementing it with the epidermis test, in which the loosened cortex is moved to and fro in clear water in order to observe whether the cuticle is thoroughly loosened and the fibres sufficiently divided.—*A. P.*

Forestry, Quarterly Journal of (No. 1, vol. 16, Jan. 1922).—"The Marketing of Native Timber," by M. C. Duchesne, is by far the most practical article, and deals with the demand and prices realised for native timber. The value of home-grown timber depends largely on age and size, as well as accessibility and distance from the consuming centre. The detailed reports from several estates of recent timber sales should be of the greatest value to foresters and estate owners. The Society's Annual Meeting and Report of the Annual Dinner occupy some 58 pages of the Journal. A short article on "Compound Interest v. Reafforestation" is particularly interesting reading.—*A. D. W.*

Forestry, Quarterly Journal of (No. 2, vol. 16, April 1922).—The Summer Meeting of the Society included visits to estates of interest, as also works either in or near London. Bayfordbury, with its well-known collection of coniferous trees, and Hatfield estate, with its ancient oaks and other trees, were visited, also the sports factory of Messrs. Gardiner, Hoddesdon, and Messrs. Wright, the Hertford Corporation cricket-bat willows, the brush factory of Messrs. Webb & Foulger. The visit to Messrs. Bryant & May's match factory was of particular interest. Two kinds of timber are used in the works, pine for "Swan" vestas, and aspen for safety matches and the boxes. Kew Gardens and

several estates as well as those above mentioned came in for a considerable share of attention. "Buds," by the Editor, follows on the lines of a similar paper by the late Lord Avebury. The bud requires to be guarded from the severe cold of winter, and in order that this may be effective the growing point is protected by scales, which are metamorphosed leaves or stipules, changed from their ordinary form for the purpose of affording protection to the delicate cells. In the case of at least one British ligneous plant, *Viburnum Lantana*, there are no scales, and the bud is said to be naked.—*A. D. W.*

Forestry, Quarterly Journal of (No. 1, vol. 17, Jan. 1923).—The Annual Summer Meeting was held in the Wye Valley district, the Forest of Dean, Eastnor Castle, and the Huntley Manor estates. Considerable attention was paid to the rare conifers at Eastnor Castle, some of these being not only uncommon but of large size. The results of tree planting on the Huntley Manor estate were most interesting, especially in connexion with the Douglas fir, Japanese larch, and Sitka spruce.—*A. D. W.*

Forestry, Quarterly Journal of (No. 2, vol. 17, April 1923).—"The Conversion of Timber," by William Forbes. This is a purely commercial transaction, and the most general method of converting it into pounds, shillings and pence is to dispose of it in a wholesale manner to the timber merchant, who either manufactures it himself or disposes of it in the round to the saw miller or the brass plate middleman. Wages and rates and taxes were never so high, and everything is against the possibility of home-grown timber being produced at anything like the price offered for it to-day.—*A. D. W.*

Forestry, Quarterly Journal of (No. 3, vol. 17, July 1923).—"Growth in thickness of a tree stem" is entirely due to the activity of a zone of cells situated between the wood and what is popularly called the bark. This layer consists of cells that are living and capable of subdividing, and of thus increasing in numbers. The wood formed during a season of growth goes by the name of a wood ring, or an annual ring. It consists of two more or less well-defined portions, namely, that which is formed in the early part of the season, the spring wood, and that which is formed later in the season, the autumn wood. This paper, by the Editor, discusses a little-known subject, but one that is of the greatest interest to those who have dealings with trees and timber.—*A. D. W.*

Forestry, Quarterly Journal of (No. 4, vol. 17, October 1923).—In connexion with the Summer Meeting in France, the visit paid to the Forest of Lyons was of the greatest interest. The principal tree grown in this State Forest is beech, for which the soil, a deep light loam on top of chalk, appears well suited, while the mild, wet climate is also in its favour. The forest is divided into working sections and treated as "high forest," the continuity being maintained by natural regeneration. The full rotation is 180 years, divided into six periods of 30 years each. At the beginning of the final period of 30 years, a heavy felling takes place to enable a certain amount of light to get through to encourage the seed-bearing of the remaining trees which are to provide the future crop. The Forest of Roumare contains about 10,000 acres of oak, beech, hornbeam, and Scotch pine, the parts inspected being almost entirely pure Scotch pine. The State rotation of Scotch pine is 75 years, divided into five periods of fifteen years each, the continuity being maintained by natural regeneration, but the first felling is sometimes left until the timber is 8 years old. Nancy and other forests were also visited.—*A. D. W.*

Forestry, Oxford Memoirs. By W. E. Hiley, M.A., and Norman Cunliffe, M.A.—The authors state that most of the attempts that have hitherto been made to demonstrate the relationship between tree growth and external influences have been limited to the measurements of the breadth of the annual rings in large stems, and the comparison of their relative breadths with the weather conditions that prevailed in each year; but, for various reasons, they considered that more reliable results might be obtained by a measurement of height increments. On the whole, the results of the experiments so far appear to be disappointing, and there does not seem to be much relationship between height and increments and the more important climatic influences, except in the effect of temperature upon Corsican pine.—*A. D. W.*

Forestry, Transactions of the Royal Scottish Arboricultural Society (vol. 36, part 1, July 1922).—This half-yearly publication opens with a valuable paper, the title being "A Discussion on Economic Planting," by Mr. G. U. Macdonald, Lecturer on Forestry in the Edinburgh and East of Scotland College of Agri-

culture. He asks, "Is it not a fact that it costs more than three times as much to plant an acre to-day as it did some eight years ago? And, is it not also a fact that the price of matured and semi-matured timber to-day is as low as it was previous to 1914?" That the prospects for the immediate future are not too bright is evidenced by the fact that several of the largest timber merchants in Scotland are to-day advertising for sale the bulk of their plant. He advocates, in order to reduce cost of forming plantations, that wider planting should be adopted.

"Notes on the Douglas Fir," by P. Leslie, and "The Bleuing of Coniferous Timber," by M. Wilson, D.Sc., F.R.S.E., are other interesting contributions. Regarding the latter, it is stated that there is a serious decrease in value of timber brought about by "bleuing."—A. D. W.

Forestry, Transactions of the Royal Scottish Arboricultural Society (vol. 36, part 2, Dec. 1922).—"Farm Forestry," by A. W. Borthwick, D.Sc., O.B.E., is a desire to call attention to the neglect in this country to turn to greater advantage, both direct and indirect, what, in the aggregate, amounts to a large area of land regarded as waste scattered about on farms, even in highly cultivated districts, such as banks, knolls, stony or rocky places, steep declivities, hollows, and marshy places. It has been said that about one-half of our home grown timber is produced in hedgerows, parks and fields, and there is no doubt that a considerable proportion of our home supplies could be grown on idle land on farms if suitable places were to be selected with care and discrimination. "Some Remarks on British Forest History," by H. G. Richardson, going back to the sixteenth and seventeenth centuries, contain a great amount of interesting matter with reference to the early history of British woods and plantations. "Report of the Annual Excursion," by R. A. Galloway, B.Sc., to some of the best wooded estates in Scotland, including Scone, Dupplin, Murthly, Taymouth, and the Duke of Atholl's woods at Dunkeld, and "Studies in the Pathology of Young Trees and Seedlings," by Malcolm Wilson, D.Sc., F.R.S.E., F.L.S., complete the principal papers contributed to this volume.—A. D. W.

Forestry, Transactions of the Royal Scottish Arboricultural Society (vol. 37, part 1, July 1923).—The opening chapter is entitled "An Industrial Opportunity," by John Sutherland, C.B.E., F.S.I., on the expansion of industry and scarcity of employment, followed by "Tree Roots: Their Action and Development," with plates, by E. V. Laing, and "Preliminary Experiments on the Germination of Conifer Seeds," by Helen I. A. Gray, M.A., B.Sc., the latter being experiments undertaken with the purpose of trying to solve a problem of some practical importance—that of hastening the germination of conifer seeds. The results obtained suggest that certain treatments of seeds, such as with cold water, iodine, and calcium chloride, are beneficial, while others are apparently ineffective, and in some cases harmful. Other articles deal with such varied subjects as comparative rate of growth of the Scotch and Corsican pines, and notes on the Forests of Auvergne.—A. D. W.

Forestry, Transactions of the Royal Scottish Arboricultural Society (vol. 37, part 2, Nov. 1923).—The Report on the Annual Excursion and List of Members, with notes and queries, take up the major part of this volume.

Freezing Temperatures of Fruits and Vegetables. By C. R. Wright and G. F. Taylor (*U.S.A. Dep. Agr., Bull. 1133*, pp. 1-7).—Many fruits and vegetables are damaged when they are stored at a temperature near their freezing point. Currants and raspberries freeze above 30° F. Bananas, blackberries, loganberries, peaches, Japanese pears and strawberries freeze between 20° and 30° F. The freezing point of apples, gooseberries, grapes, grapefruit, lemons, oranges, Bartlett pears, plums, and black raspberries is 28°-29° F. Cherries and soft Bartlett pears freeze at 27°-28° F., and cranberries at 26°-27° F. Cabbage and lettuce freeze above 31° F.; cauliflower, egg plant, kohlrabi, onions, peas, tomatoes, and turnips at 30°-31° F.; beans and carrots at 29°-30° F.; potatoes at 28°-29° F. Easter lily petals freeze at 27°-28° F.; pavony petals at 28°-29° F.; rose petals at 30°-31° F.—S. E. W.

Frosts, The Formation and Pathological Anatomy of Frost Rings in Conifers injured by Late. By Arthur S. Rhoads (*U.S.A. Dep. Agr., Bull. 1131*, Feb. 1923).—The pathological anatomy of late-frost injury has been studied in detail by the writer. Late frost injury results in very characteristic disturbances in the tissue of the growth ring forming at the time of the injury. The structural disturbance initiated by the action of late-frost injury is not confined to the shoots then developing, but extends down the stem for distances

varying from several inches to several feet, or, as far as the cambium has been injured by the freezing without entailing the death of the stem. The healing proceeds internally, and results in the formation of a brownish zone of parenchyma wood, or frost ring, within the growth ring, developing at the time of the injury. As may be expected from their structure, frost rings constitute a plane of weakness in the wood, which to a large extent may prevent its use for structural purposes.—A. D. W.

Fruit, Preserving. (*Ind. Hort. Soc. vol. v. pp. 155-157*).—The following preparations are recommended for preserving fruit for exhibition :

- I. Formalin, 16 oz. ; water, 44 lb. ; alcohol, 5 pints.
- II. Boric Acid, 1 lb. ; water, 45 lb. ; alcohol, 3 pints.
- III. Zinc chloride, $\frac{1}{2}$ lb. ; water, 15 lb. ; alcohol, 2-3 pints.
- IV. Sulphurous acid, 1 quart ; water, 3 pints ; alcohol, 1 pint.

For strawberries use preparation I.; raspberries, I., II., III. or IV.; cherries, red or black, I. or II.; white cherries, IV.; black currants, II.; red currants, I. or II.; white currants, III. or IV.; gooseberries, I. or II.; apples, green or russet, III.; apples, red, II.; apples, white or yellow, IV.; pears, russet, III.; pears, green or yellow, IV.; plums, dark, I. or II.; plums, green, IV.; peaches and apricots, nectarines and quinces, use No. IV.; grapes, red or black, I. or II.; for green or yellow grapes take preparation IV.—S. E. W.

Fruit Trees' Sour Sap. By W. A. Birmingham (*Agr. Gaz., N.S.W.*, vol. xxxiv. pp. 431-437; 4 figs.).—Sour sap of fruit trees appears to be due to physiological disturbance, not to an organism. It is not due to lack of lime or nitrogen in the soil nor to deficient drainage. Extreme weather conditions probably induce the disease, but no remedy has yet been discovered. Microscopical examination of the roots of diseased trees reveals the presence of gum in the tissues.—S. E. W.

Fungicides on Apple Trees, Tests of. By N. H. Grubb (*Jour. Pomology* vol. iii. No. 4, Jan. 1924, pp. 157-173).—Further investigations as to the effect of Bordeaux mixture, lime sulphur, and ammonium polysulphide on apple trees (*Jour. Pomology*, vol. ii. No. 2).

Bordeaux mixture (6 : 20 : 100) successfully controlled scab (*Venturia inaequalis*), but was the least effective of the three washes against mildew (*Podosphaera leucotricha*) and caused considerable russetting of the fruit of 'James Grieve,' 'Newton Wonder,' and 'Lord Derby.' Lime sulphur (1 : 59) reduced scab and was slightly effective against mildew, but, when used as a summer wash, repeatedly caused heavy dropping of fruit on all the varieties sprayed, and especially on those trees which had the leaders tipped. Ammonium polysulphide was less efficacious against scab than Bordeaux and lime sulphur, but gave more promising results against mildew than Bordeaux.

Bordeaux and lime sulphur used in 1920 reduced the number of canker (*Nectria ditissima*) infections on 'Worcester Pearmain' and 'James Grieve.'

The effect of fungicides is not confined to the season of application, for results can often be seen one or two years later, and vigour of growth, as measured by the weight of prunings, appears in most cases to be increased.—G. F. W.

Gardenias, New. By O. Occhialini (*Rev. Hort.*, vol. xciv. pp. 274-275; 2 figs.).—'Regina Elena di Savoia' is a robust shrub, six feet high, with large lanceolate leaves and groups of two or three flowers. The petals change from white to gold, but the base is green. The flowers are sterile and last for several days, exhaling a pleasant perfume. The shrub continues to flower from June to September. 'G. Prof. Andrea Pucci' bears highly scented flowers which last many days. They are hermaphrodite.—S. E. W.

Geranium, Bacterial Leaf-Spot on. By Nellie A. Brown (*Jour. Agri. Research*, vol. xxiii. No. 5, Feb. 1923, pp. 361-372; 3 plates).—A bacterial leaf-spot disease of the cultivated geranium (*Pelargonium* spp.) is widespread in the Eastern States. It commonly occurs on greenhouse plants, but is found occasionally on plants grown out of doors. The spots on the leaves may begin at the margin or in the blade, and are usually irregular in shape and brown in colour. As the disease advances, the parts of the leaf between the spots turn black and wither. The causal organism is a motile rod bacillus with polar flagellum, forms capsules, liquefies gelatin, forms cream-coloured shining colonies on agar; reduces litmus and methylene blue, is aerobic, Gram negative, no gas produced from sugars or alcohols tested. The bacteria occur in pairs, average size $1\cdot02 \times 0\cdot06 \mu$; is pathogenic to cultivated geraniums. The name *Bacterium Pelargoni* is suggested for this organism.—A. B.

Grape Production in Michigan. By N. L. Partridge (*Agr. Exp. Sta. Mich., Bull. 121*, pp. 3-23; 11 figs.).—The vineyard demands frequent cultivation during the growing season. Humus is supplied to the soil by means of cover crops of oats and mammoth clover or rye and vetch. Farmyard manure is very valuable; in its absence 200 lb. of sodium nitrate to the acre is recommended. Phosphates and potash are not so essential. Spraying the young growth with Bordeaux mixture is a protection from black rot and downy mildew. Spray again before blossoming with a mixture of Bordeaux and calcium arsenite or lead arsenate. Repeat when the blossoms fall, and again a fortnight later.

S. E. W.

Helenium Hoopesii (Western Sneezeweed) as a Poisonous Plant. By C. D. and H. Marsh, A. B. Clawson, and J. F. Couch (*U.S.A. Dep. Agr., Bull. 947*, Oct. 1921; 2 plates, 5 figs., 13 tables).—This plant has been proved to be the cause of the disease in sheep known as spewing sickness, and has also been shown to be poisonous to cattle. The poisonous principle of the plant is an easily decomposed glucosid to which the name dugaldin has been given. No medicinal remedy has been found for effectively treating poisoned animals and there seems no method of getting rid of the weed which is economically practicable.

A. P.

Honeybees, The Effect of Activity on the Length of Life of. By E. F. Phillips (*Journ. Econ. Entom.* vol. xv. pp. 368-371, Oct. 1922).—These experiments confirmed the opinion that the greater the activity of the bees the shorter the term of life.

It is interesting to note that, of the bees kept under varying conditions without food, the majority died on the first or second day, whilst those with food averaged six and a half days. Both periods are stated to be shorter than the normal life in the hive.—G. W. G.

Hortensia Cultivation. By A. Petit (*Rev. Hort.*, vol. xciv. pp. 438-440).—*Hydrangea hortensis* dislikes an acid soil and also dislikes lime. The best compost consists of a mixture of peat with one quarter of its bulk of garden soil or manure. It should not contain more than $\frac{1}{2}$ per cent. of calcium carbonate. Too much manure induces chlorosis, but this can be checked by the addition of 3 per cent. of sulphate of iron. Peat is not indispensable if lime-free soil can be procured.—S. E. W.

House-Fly, Is the, in its Natural Environment attracted to Carbon Dioxide? By Chas. Richardson and Eva Richardson (*Journ. Econ. Entom.* vol. xv. pp. 425-429, Dec. 1922).—The experiments confirmed the conclusion drawn from earlier work—namely, that ammonia is largely responsible for the attraction of the house fly to fermenting organic substances.

Bran, which volatilizes the products of decomposition of ammonium carbonate in aqueous solution, attracts the house-fly and induces egg laying.

Since carbon dioxide and water, two of the final decomposition products of ammonium carbonate, do not in themselves induce egg laying, it is believed, therefore, that ammonia is largely responsible for the attraction to ammonium carbonate.

The possibility of other substances augmenting the attraction to ammonia is admitted, but no definite proof of it was indicated in the 137 experiments completed.—G. W. G.

Hydrocyanic Acid Fumigation, Resistance of Certain Scale Insects in Certain Localities. By H. J. Quayle (*Journ. Econ. Entom.* vol. xv. pp. 400-404, Dec. 1922).—The writer's long experience of fumigation, both experimentally and in the field, has led him to conclude that the citrus red scale (*Chrysomphalus aurantii* Mask) has acquired a resistance to HCN which is so high that effective fumigation is unsafe for the tree except under most favourable conditions. There are two districts where these remarks apply, and it is suggested that the acquired immunity and factor of resistance is hereditary. The greatest resistance is shown by scales on trees that have been fumigated once or even twice a year regularly.

Careful comparative tests with material collected from different localities on the same day, and fumigated in identical conditions, showed as great a variation as $\frac{1}{2}-\frac{1}{4}$ per cent. scales alive after fumigation. Other factors influencing the kill obtained are discussed. It is worth noting that scales on trees with an abundance of foliage require a larger dosage than where infested branches and fruit are placed under a tent of identical shape and size. This is explained by the absorption of HCN by the foliage itself, leaving less free gas to react on the insect.—G. W. G.

Improvement of the Farm Woodlot. By A. K. Chittenden (*Agr. Exp. Station, Michigan Agricultural College, Bull. Sept. 1923*).—The average Michigan woodlot is probably growing at the rate of about one standard cord of wood or its equivalent in board feet an acre a year. The report of the Fourteenth Census shows a total area of 3,217,000 acres of woodlands on the farms in Michigan, which is about 17 per cent. of the farm area of the State. In view of the decreasing timber supply, the woodlots are of much economic importance. With the rapid diminution of timber in the south and west, from which places much of our lumber comes at the present time, there will be an increasing need for wood-lots for the supply of railroad ties, fence posts and other woodlot products.

A. D. W.

Ipomoea rubra caerulea. By G. T. Javit (*Rev. Hort.* vol. xciv. p. 109).—To obtain flowers of *Ipomoea rubra caerulea* by midsummer, raise the plants from old seed, which is clipped at the end and soaked in tepid water for ten hours before sowing in a sunny site.—*S. E. W.*

Irises, Dutch. By S. Mottet (*Rev. Hort.* vol. xcv. pp. 342–344; 1 fig.).—The best Dutch Irises are 'David Teniers,' lavender with yellow blotch; 'Anton Mauve,' delicate blue with dark blue spots; 'Imperator,' a very fine variety with highly developed crests, flowers violet-blue with yellow blotches; 'Hobbema,' falls yellowish-white, standards bluish-white; 'Pieter de Hoog,' blue with bright yellow blotches; 'Rembrandt,' dark blue with orange blotch; 'Van Eyck,' cream splashed with orange.—*S. E. W.*

Irises, Orchid Flowered. By S. Mottet (*Rev. Hort.*, vol. xciv. pp. 236–237; 1 col. plate).—The Irises in this list are remarkable for the size and colour of their flowers; 'Ambassadeur,' five feet high, reddish-violet, late; 'Alliés,' dwarf, semi-early, porphyry-red shaded with violet. 'Ambigu' and 'Opéra' are semi-early and semi-dwarf, violet-purple. 'Archevêque,' 'Monsignor' and 'Velouté' semi-late, dwarf, violet-blue or violet-red. 'Ballerine' is a tall pallida with immense pale blue-violet scented blooms, semi-early. 'Magnifica' tall large violet-blue and red flowers. 'Déjazet,' dwarf, early, large pink blooms tinged with bronze. 'Eldorado,' dwarf, very open flowers, bright yellow and violet in colour. 'Grévin,' 'Médranio,' 'Molière' are strong growers with large reddish-violet flowers. 'Raffet' late dark blue, 'Trianon' and 'Turco' yellow changing to blue. 'Mrs. Walter Brewster' tall, lavender and violet-blue. 'Zouave' is dwarf and floriferous, lilac.—*S. E. W.*

Kernel-Spot on the Pecan, and its Cause. By J. B. Demaree (*U.S. Dep. Agr., Bull. 1102*, Sept. 1922).—The object of the series of experiments herein reported was to determine the true cause of pecan kernel-spot, and its relation, if any, to certain sucking insects and parasitic fungi. The results of the experiment demonstrates very conclusively that punctures by the southern stinkbug (*Nezara viridula*) were either directly or indirectly the cause of kernel-spots, with the evidence strongly favouring a direct causal relation. Owing to the fact that the spots cannot be seen until the shells of the nuts are removed, and also because pecans from planted orchards are usually widely distributed, in small quantities, to consumers, the extent of the loss caused by kernel-spot is difficult to estimate.—*A. D. W.*

Lettuce Mildew in California. By D. G. Milbrath (*Jour. Agri. Research*, vol. xxiii. No. 12, March 1923, pp. 989–994; 3 plates).—Climatic conditions in California are favourable and conducive to the growth of *Bremia lactucae* on lettuce in the field, and its widespread damage can only be effectively controlled by developing resistance in certain varieties of the lettuce.

The fungus is one of the Peronosporaceae and can reproduce itself by zoospores, as well as by the ordinary methods of reproduction. The author finds that the variety of lettuce known as 'Iceberg' is highly resistant to the attacks of *Bremia lactucae*, and suggests that this variety should be grown.—*A. B.*

Liming of Soils. By H. Wenholz (*Agr. Gaz., N.S.W.*, vol. xxxiv. pp. 7–13).—The desirability of liming soils in Australia can only be decided by field experiments, not by chemical analysis alone. It is generally unprofitable except in the case of peaty or swampy soil. Acid soils and soil containing less than 1 per cent. of calcium carbonate are not improved by liming in New South Wales. This is probably due to the rapid oxidation of organic matter in presence of lime in hot climates, and the consequent poverty of the soil in humus. On the other hand, superphosphate benefits the crops.—*S. E. W.*

Magnolias, New. By C. Leroy (*Rev. Hort.* xcv. pp. 314-316, 337-338; 2 figs.).—Several new Magnolias have been recently introduced from China. *M. officinalis* is distinguished from *M. hypoleuca* by its lower growth (30-45 feet) and by its yellowish grey bark and its ovoid fruit. It has large leaves and bears isolated sweet-scented white flowers on the extremity of its new shoots. *M. conspicua* var. *purpurascens* is a tall tree with open erect flowers. The interior of the corolla is pale pink, the exterior red. The stamens and carpels are pink. *M. Nicholsonii* resembles *M. Wilsonii*. The cup-shaped flowers are borne on last year's wood and open in June. They are sweet-scented, white with red stamens. The cylindrical fruit contains scarlet seed. *M. Dawsoniana* and *M. aulacosperma* have not been flowered. This is also the case with *M. Sargentiana*, a magnificent tree 45 to 60 feet high, with large leaves. *M. Sargentiana* var. *robusta* differs from the type in the large size of its fruit. *M. Wilsonii* is noted for its large white scented flowers enriched by brilliant red stamens and carpels. It is a hardy shrub, 9 to 12 feet high, very floriferous. It flowers in June: the corolla, which is shaped like a shallow cup, turns towards the sun. The large cylindrical ovoid fruit contains scarlet seed. In many respects *M. Wilsonii* resembles *M. parviflora*.—*S. E. W.*

Maize, Inheritance of Ramose Inflorescence in. By J. H. Kempton (*U.S.A. Dep. Agr. Bull.* 971, Dec. 1921; 16 plates, 5 figs., 6 tables).—The branched-ear variation designated *Zea ramosa* by Gernert has behaved generally as a simple Mendelian character recessive to the normal condition. Crosses have been made between this ramose type and one from Mexico called Gordo with very few tassel branches, departing from the common form in the opposite direction from that of the ramose variation, and in a general way this Gordo type of stamineate inflorescence has been found to be dominant to the ramose form in the first generation of the hybrid, while in the second generation of these hybrids the plants segregate into normal and ramose plants. Another ramose strain has been found in which an intermediate ramose condition is common, and the appearance and behaviour in inheritance of the intermediate ramose plants suggest a relationship with branched forms from non-ramose stocks, and furnish evidences for the development of the single-spiked ear through a reduction of branches.—*A. P.*

Mercury as an Insecticide, Metallic. By A. O. Larsen (*Journ. Econ. Entom.* vol. xv. pp. 391-395, Dec. 1922).—Experiments were tried to test the old Indian method of protecting seed in store from weevil and other insect damage, by placing a small quantity of mercury in the container.

The results obtained proved Dr. Kannan's assertions to be correct: eggs laid failed to hatch, and the attack terminated with the death of the *Bruchus quadrimaculatus* introduced into the container. There was no apparent loss of mercury, which could be used over and over again.—*G. W. G.*

Mice, Destruction of. (*Ind. Hort. Soc. vol. v.* pp. 150-153).—Mice in orchards can be poisoned by a bait prepared by sprinkling powdered strichnine ($\frac{1}{2}$ oz.) and baking powder ($\frac{1}{2}$ oz.) over 4 quarts of crushed oats. Pour a mixture of melted paraffin (1) and melted beef fat (3) over the grain, previously heated in the oven. Twelve tablespoonsfuls suffice for 4 quarts of oats. One tablespoonful of the bait placed in a box, drainpipe, or jar, is deposited at the foot of each tree.—*S. E. W.*

Mistletoe, The Western Yellow Pine. By Clarence F. Korstian (*U.S.A. Dep. Agr. Bull.* 1112, Dec. 1922).—The western yellow pine is subject to severe injury by mistletoe (*Razoumofskya cryptopoda*). The injury to the forest caused by the insidious and destructive action of this pest results in serious losses of western yellow pine, and presents one of the most important silvicultural problems in the south-west. Trees of all age-classes are subject to mistletoe infection, provided the seeds of the parasite fall on parts of the tree which are not protected by the bark. Young seedlings and saplings usually die comparatively soon after being severely infected, while older trees may remain alive for a much longer time. The most practical method of controlling mistletoe is to remove the infected trees while cutting operations are in progress.—*A. D. W.*

Mosquitos and Tent Caterpillars, The Value of Carbon Bisulphide in Combating (*Journ. Econ. Entom.* vol. xv. p. 373, Oct. 1922).—In "Scientific Notes," A. K. Fisher reports the effect of dropping a very small quantity of carbon bisulphide into a 10-gallon tub of water swarming with mosquito larvæ. Within a few minutes undue agitation amongst the insects occurred, and in half an hour all were dead and floating on the surface of the water. No smell or taste was given to the water by the few drops of CS₂ added.—*G. W. G.*

Nicotine Delivery from Dust Carriers. By Wm. Rudolfs (*Journ. Econ. Entom.* vol. xv. pp. 421-424, Dec. 1922).—An account is given of some laboratory tests with nicotine carriers, which may be summarized:

1. Nicotine derived from nicotine sulphate is evolved most readily when a large percentage of carbonates (Ca and Mg) is present, and under the influence of high temperature and high atmospheric moisture conditions.

2. Nicotine derived from high strength (95 per cent.) "free" nicotine solution is evolved from dolomite and hydrated lime at approximately the same rate; and more rapidly under high temperature and low atmospheric conditions. Under these conditions the active principle is evolved much more rapidly than from nicotine in the sulphate form.—G. W. G.

Nitrates in Soil, The Estimation of, by the Phenol Disulphonic Acid Method. By C. T. Gimingham and R. H. Carter (*Jour. of Agr. Science*, vol. xiii. Pt. I, pp. 60-62).—The authors draw attention to the error resulting from the use of unsuitable filter papers.—A. S.

Orchard Heating. By F. L. West and N. E. Edlefsen (*U.S.A. Exp. Sta., Utah, Bull.* 161, 1917).—Approximately one-fifth of the fruit crop of Utah farms is destroyed by frost. Irrigation, sanding, cultivating, water vapour, carbon dioxide, smudging with smoke, covering trees and plants with cloth or straw have been tried; 100 heaters an acre raised the temperature 4 degrees when calm, but only 1 $\frac{1}{2}$ degrees when a wind of 10 miles an hour was blowing. The cost is compared of heating with coal and with oil. A frost-free situation is, of course, better than a situation liable to damage by frost. To increase one's profits on the latter, or decrease one's losses, the sale price of the fruit must be high, the fuel must be cheap, the frosts must not be accompanied by winds, and the heating must be carried out according to the most modern methods with military precision.—C. H. H.

Organic Acids in Crab Apple (*Pyrus coronaria* L.), the Sugar Maple (*Acer saccharum* Marsh), and Sumac (*Rhus glabra* L.). By Chas. E. Sando and H. H. Bartlett (*Jour. Agri. Research*, vol. xxii. No. 4, Oct. 1921, pp. 221-230).—The authors found that malic acid is always present in the juice of the wild Crab Apple (*Pyrus coronaria* L.). When the fruit undergoes autolysis under anaerobic conditions in presence of chloroform and toluol, this acid appears to be transformed largely into succinic acid. In the sap of the Sugar Maple (*Acer saccharum* Marsh) malic acid is present in the form of calcium salts. The product "maple sand" is crude Calcium malate.

The acids in the outer part of the fruit of the Sumac (*Rhus glabra* L.) are malic acid as Calcium malate, and also large quantities of free gallic acid.

The transformation of the malic acid in the Crab Apple into succinic acid is due apparently to the action of enzymes in the fruit itself, without any action of micro-organisms, bacteria, or yeasts.—A. B.

Our Depleted Hardwood Areas: the Necessity for Restocking. By A. D. C. le Sueur.—This subject has occupied the attention of many foresters and timber merchants of late years, but especially since the war. There seems to be a tendency when working out planting schemes to overlook hardwood altogether, the reason given being that the market for such is poor and uncertain. From the economic point of view it is surely better to grow a stand of good-quality timber, for which there is a steady demand at a fair price, than to grow a heavier but lower-priced crop of another type for which, very probably, a purchaser is not immediately forthcoming, and has to be sought for at a distance. At the present time the species that appear to have the best prospects are ash, beech, sycamore, sweet chestnut, and poplar.—A. D. W.

Pawpaw. By J. Troop (*Indiana Hort. Soc. vol. v.* pp. 147-150).—The Pawpaw (*Asimina triloba*) is widely distributed in the wild state in the United States. It is difficult to propagate by budding or grafting, and it seldom survives transplanting. To raise from seed, sow two or three seeds three inches deep in a mound of earth. Protect the seedlings from direct sunlight for two years by surrounding the mound with a barrel from which both ends have been removed. In six or eight years the trees begin to bear.—S. E. W.

Peas for Canning. By D. N. Shoemaker (*U.S. Dep. Agr., Farm. Bull.* 1253, pp. 1-16; 4 figs.).—The most popular pea for canning in the United States is the Alaska. It is characterized by a single stem 2-2 $\frac{1}{2}$ feet high, bearing three to six pods, which ripen early almost simultaneously. The dry seed is usually smooth with a certain proportion of pitted seeds.—S. E. W.

Peas for Canning. By C. J. Hunn (*U.S. Dep. Agr., Farm. Bull.* 1255, pp. 1-24; 8 figs.).—Peas are grown on a four- or five-system of rotation—e.g. (1) clover or alfalfa; (2) hay; (3) maize, potato, or cabbage; (4) peas; (5) wheat, oats, or barley. They may also be grown in conjunction with alfalfa, or early peas may be followed by maize, millet, tomatoes, or Lima beans, cabbage wheat, or alfalfa. After harvesting the pea crop, the haulms are used as food for live stock.—*S. E. W.*

Phalaenopsis Hybrids. By A. Guillamin (*Rev. Hort.* vol. xcv, pp. 499-501).—*Phalaenopsis Schillmanii*, a hybrid of *P. Schilleriana* and *P. Manii*, has large silvery leaves with dark green spots. The sepals and lateral petals resemble those of *Manii*, but are larger and spreading. The base of the petals shows red spots and the labellum is white with some red spots.

The parents of 'Britannia' are *cornucervi* and *Schilleriana*. The predominance of *cornucervi* is very marked. The labellum is white or yellow and the sepals and lateral petals are some shade of pink with dark pink spots.

P. maurensis, a hybrid of 'Aphrodite' var. *gloriosa* and 'Esmeralda,' resembles 'Esmeralda.' The labellum is dark violet and the lower sepals pale carmine.

P. flava exhibits the characteristics of both its parents, *amabilis* and *lutescens*. The petals and sepals are of a shade of yellow previously unobserved. The long labellum is dark red. *P. Rimesand*, derived from *amabilis* var. *Rimestadiana* and *Sanderiana*, has white sepals and petals.

Punctatissima shows no trace of *Stuartiana*, but resembles its other parent *violacea*. 'Monsieur Liouville,' obtained by crossing *leucorrhoda* with *Luddemanniana*, has white petals and lateral sepals with purple base marked with transverse bands of purple. The influence of the grandparent 'Aphrodite' var. *aurea* is marked.

Hybrids of *Rothschildiana* with *intermedia* var. *Portei* and this hybrid with 'Leda' are somewhat alike, resembling 'Aphrodite' in general form.—*S. E. W.*

Pine Blister Rust, Investigations of the White. By Percy Spalding (*U.S. Dep. Agr. Bull.* 957, Feb. 1922).—In a previous publication the writer collected data on the more practical aspects of the white pine blister rust, as presented in European literature. Some writers have believed that the blister rust (*Cronartium ribicola*) went to Europe from America on *Ribes aureum*, that host being associated with it in the earlier discoveries of the disease in Europe. The fungus was not known in Great Britain until 1892, long after it was prevalent in other northern European countries. It was carried to Great Britain on infected white pines from north-west Germany.—*A. D. W.*

Pines, A Sawfly Injurious to Young. By W. Middleton (*Farmers' Bull.* 1259, Jan. 1922).—The larva, or false caterpillar, of an insect known as Leconte's sawfly is a serious enemy of pine in nurseries, parks, and reforested areas in the eastern United States. It seems to have a preference for jack pine, red pine, and scrub pine, each of which furnishes a local host in some part of the eastern United States, throughout which the insect occurs. The control of Leconte's sawfly depends largely upon the extent and location of the infestation. A thorough spraying with lead arsenate, 2 lb. of powdered lead arsenate to 50 gallons of water, will give good results.—*A. D. W.*

Pinus leucodermis. By S. Mottet (*Rev. Hort.* vol. xcv, pp. 332-334; 2 figs.).—The most interesting variety of *Pinus laricio* is *P. leucodermis*, a native of Dalmatia, Montenegro and Herzegovina. The thick dark green foliage is very decorative; the tree is worthy of a place in every park.—*S. E. W.*

Plant Influence upon the Air of Houses. By G. B. Rigg, Thos. G. Thompson, and William L. Gilliland (*Amer. Jour. Bot.* x, No. 7, July 1923, pp. 383-386).—Determinations of the carbon dioxide content of the air in a greenhouse indicate that the concentration of this gas did not reach a point high enough to be dangerous to human beings, and that under the conditions existing in this greenhouse, the effect of plants in increasing CO₂ content is negligible compared with the effect of people who visit the greenhouse. Therefore any ill-effects experienced by the presence of plants in rooms must be due to some other cause than carbon dioxide production.—*A. B.*

Plant Nutrition as an Electrical Phenomenon. By James F. Breazeale (*Jour. Agr. Res.* xxiv, No. 1, April 1923, pp. 41-54; 8 tables).—When wheat seeds are placed in a nutrient solution and the germination has commenced, the demand of the embryo and seedling for food is first supplied from the endosperm. As growth proceeds a further demand for food arises in the tissues of the seedling.

The demand is for particular foods, and the effect of plant food as a fertilizer acts directly upon the plant itself rather than upon the soil. The author holds that the plant feeds upon ions which penetrate the root membrane and move through the colloids to the tissues as an electrical charge. Ions are mobile and may move through the soil solution freely as such. This being the case, the plant may not be dependent upon the soil grains that touch its roots for nutrient material, but may feed at a distance from its source of supply.—A. B.

Plant Nutrition, Manganese and its Salts and. By J. S. McHargue (*Jour. Agric. Res.* xxiv. No. 9, pp. 781-794; 2 plates).—Manganese is required for the normal growth of plants, and is apparently necessary in photosynthesis and chlorophyll development. Leguminous plants are more sensitive to the lack of manganese than other plants, and this lack affects the production of the dry matter in plants. The seeds of some plants contain enough manganese to maintain a normal development for the first four or six weeks of their growth, but do not contain sufficient for the growth of the plants to maturity. Manganese is often associated with compounds of iron, phosphorus, and calcium, therefore great care is essential in the experiments to ensure a medium free from manganese in which to grow the plants.

The occurrence of soluble salts of manganese in an acid soil may be one of the causes of toxicity in such soils. An excess of manganese sulphate renders soil sterile for the growth of plants. Calcium carbonate causes a diminution in the toxic effects produced by excess of manganese sulphate.—A. B.

Plants from the Moroccan Atlas. By E. Jahandiez (*Rev. Hort.* vol. xciv. pp. 95-96, 142-144; 2 figs.).—*Ranunculus calandrinioides* is found at an altitude of 4,300-6,000 feet in the Atlas. It is a gem for the rock garden, bearing numerous pale pink flowers somewhat resembling a Christmas Rose. *Papaver atlanticum*, found on stony ground 5,200-6,000 feet above sea-level, is related to *P. rupifragum*. It bears salmon-red flowers in May and July.

Polygala Balansae thrives on rocky ground at 3,000-5,500 feet. This shrub grows to a height of five to six feet and bears large dark purple flowers in May or June.

Cytisus Battandieri attains a height of nine to twelve feet. It has silky foliage and is covered with innumerable golden flowers in June and July. *Gevista florida* var. *maroccana* is very floriferous. The golden flowers flourish from the middle of June to the end of July. *Ononis Thomsonii* occurs in volcanic districts at an altitude of 5,400-6,000 feet. It is a good rock plant with dark red flowers. *O. atlantica* is a prickly shrub with pale yellow blossom. *Astragalus atlanticus* is a charming shrub bearing globular heads of yellow flowers. *Coronilla vaginalis* is one of the glories of Morocco. The shrub exceeds six feet in height and is covered with white or pink flowers. It was introduced into cultivation in England more than a century ago. *Adenocarpus anagyrifolius* is a handsome shrub thriving amidst the stones and gravel of the Great Atlas at an altitude of 3,600-7,500 feet. It has been grown in the South of France for years. *Eryngium variifolium* is found in moist places. The dark green lustrous leaves are splashed with white. *Pterocephalus depressus* adorns the rockery, forming velvety cushions with violet flowers. The well-known *Bellis caerulescens* is in flower on grassy slopes in June and July at 5,100-7,200 ft. *Gnaphalium helichrysoides* is rare. The prostrate stems cling to the rocks and produce dark tubular flowers in June and July. *Santolina scariosa* is remarkable for the perfume of its yellow flowers. *Chrysanthemum catananche* is a charming rock plant. *Cnicus chrysanthus* is a beautiful thistle, three feet high with golden flowers. *Linaria ventricosa* makes upright growth, reaching five feet. It is covered with long bunches of yellow flowers streaked with brownish red.

Salvia taraxacifolia has a pleasant smell; it has a woolly calyx and a large pink corolla and flowers in May or June. *Rumex Papilio* is very rare. The diaphanous veined seed vesicles surrounded by a red edging closely resemble butterflies. *Acacia gummifera* and *Argania Sideroxylon* are too tender to survive the winter except in favourable spots in the South of France.—S. E. W.

Plum Blotch. By John W. Roberts (*Jour. Agri. Research*, vol. xxii. No. 7, Nov. 1921, pp. 365-370; 1 plate).—Plum blotch, a hitherto unknown disease of the Japanese Plum (*Prunus triflora*) has been found in Georgia, the varieties 'Abundance' and 'Burbank' being specially susceptible. From the diseased twigs and fruits the fungus (*Phyllosticta congesta* Heald and Wolf) was isolated and grown in pure cultures, and spores from these cultures caused the disease on healthy fruits and leaves.

No attempts have been made to control Plum Blotch disease, but control measures are discussed.—A. B.

Polemonium Magnieri. By C. Magnier (*Rev. Hort.* vol. xciv. p. 81).—*Polemonium Magnieri* is intermediate in character between its parents *P. coeruleum* and *P. reptans*. Its pretty blue flowers and fresh foliage make it a welcome addition to the flower border.—*S. E. W.*

Poplars, Diseased. By E. Foëx (*Rev. Hort.* vol. xcv. pp. 476–477).—Poplars are attacked by a fungus, *Cenangium populinum*, which does serious damage. As a precaution treat cuttings with Bordeaux mixture before planting; burn diseased trees, cut out dead wood and snags, paint wounds with tar, and plant early in December.—*S. E. W.*

Potato, Copper Absorption by the. By F. C. Cook (*Jour. Agri. Research*, vol. xxii. No. 5, October 1921, pp. 281–287).—Potato plants can absorb copper from the soil, and this may pass to the stem and leaves. The tubers as a rule contain only traces of copper. The roots can also retain copper when the soil is treated with copper sulphate solution. This causes injury to the plants, but insoluble copper compounds do not.—*A. B.*

Potato Culture. By H. C. Moore (*Agr. Exp. Stn. Mich., Bull.* 117, pp. 3–27; 18 figs.).—Good crops of potatos may be ensured by disinfecting the seed potatos by immersion in a solution of corrosive sublimate (4 oz. to 30 gallons). Dry in a cool shed, then expose to the light until green sprouts appear, cut into sections and plant. Spray with Bordeaux mixture when the plants are four inches high, and again at intervals of two weeks through the growing season. The addition of arsenate or arsenite of lime to the Bordeaux mixture (1–1½ lb. to 50 gallons) will check the Colorado beetle, Flea beetle, and Tomato worm. To remove aphides add ½ pint of a 40 per cent. solution nicotine sulphate to 50 gallons of the Bordeaux mixture. The crop is stored in a cellar at a temperature of 35° F. to 40° F., or in pits. In either case good ventilation is essential.

S. E. W.

Potato Scab. By E. Foëx (*Rev. Hort.*, vol. xciv. pp. 194–196, 221–222, 261–262; 1 col. plate).—Three methods are in use to protect the potato crop from scab. (1) Plant only immune varieties; (2) Disinfect the seed potato; (3) Render the soil unfavourable to the development of *Actinomyces* by green manuring or by acidifying the soil by the addition of superphosphate or “incubated sulphur.”—*S. E. W.*

Potato Yields, Determination of the Best Method for Estimating, together with a Further Note on the Influence of Size of Seed on the Character and Yield of the Potato. By R. N. Salaman (*Jour. of Agr. Science*, vol. xiii. pt. 4, pp. 361–389).—An account of work carried out in order to discover what is the best shape, and what is the best size of plot, and what the most desirable number of repetitions of the same, to ensure the highest practicable accuracy, as determined by the lowest probable error of the difference of the mean, in the estimation and comparison of yields of different varieties of potato. The author also shows the relationship between size of seed and (a) gross crop, (b) proportion of ware, and (c) the incidence of various diseases.—*A. S.*

Primula obconica Rivoirea. By E. Lamprop (*Rev. Hort.* vol. xcv. pp. 416–417; 1 col. plate).—*Primula obconica Rivoirea* is remarkable for the size and colour (carmine-red) of its flowers, which are borne on strong stalks. It comes true from seed.—*S. E. W.*

Propagation of Oranges. By A. Vidault (*Rev. Hort.* vol. xciv. pp. 76–77).—As orange-trees raised from seed are subject to gummification, it is better to propagate by grafting, using the bitter orange (*Citrus amara* or *Bigaradia*) as stock. The scion is not taken from new growth.—*S. E. W.*

Protoplasm of Root Hairs and Hydrogen-ion Effects. By Ruth M. Addoms (*Amer. Jour. Bot.* x. No. 4, April 1923, pp. 211–220; 1 plate).—Abnormal root development and decreased growth in plants grown in nutrient solutions containing relatively large amounts of potassium dihydrogen phosphate is attributed to the coagulation of the protoplasm of the root hairs. This coagulation, which is accompanied with flocculation, is found to be induced by the hydrogen ions formed by dissociation of the phosphate. The H-ion concentration of the nutrient solutions varied from PH 3.94 to PH 3.47. It is possible to explain the abnormal root development to be due to the presence of an injurious quantity of potassium dihydrogen phosphate. The H-ions precipitate the protoplasm of the root hairs, increasing their permeability and preventing them acting as absorption organs. As the root hairs become ineffective more are

formed, and then further roots are developed to absorb the necessary water. This is an example of the Le Chatelier-Braun theorem, which states that a system affected by an outside condition tends to alter within itself in such a way as to oppose and annul the effects of this outside condition.—A. B.

Pruning Fruit Trees. By R. E. Marshall (*U.S. Exp. Sta., Michigan, Bull. 118*, 1922).—Experience recommends leaving fruit spurs and short shoots on the scaffold branches of young apple-trees. As to time of pruning, slight preference is given to late winter or early spring, but for ordinary purposes from fall of leaf to opening of buds; pruning the older apples and pears in early winter, and reserving the stone fruit and younger trees for pruning in late winter and spring. Summer pruning of fruit trees is not generally recommended. For painting wounds larger than $1\frac{1}{2}$ or 2 inches, white lead paint is recommended, adding 1 oz. of cyanide or bichloride of mercury dissolved in turpentine mixed with each gallon of paint.—C. H. H.

Pruning Young Olive Trees. By Frederick T. Bioletti (*Coll. of Agr., Univ. of California, Bull. 348*, Sept. 1922).—The pruning of an olive tree has two purposes—one, to give it the form that is deemed best for cultivation, harvesting, and other operations; the other, to regulate the size and the quality of the crop. The object is to give the tree the desired form in the shortest time, and to do this as economically as possible. The method commonly adopted by careful growers in California is to head back, more or less, every branch of young olives, with the object of forming a solid, stocky framework, which will hold a heavy crop and resist wind damage.—A. D. W.

Purple Vetch. By R. McKee (*U.S. Dep. Agr., Circ. 256*, pp. 1–5; 1 fig.).—The purple vetch (*Vicia atropurpurea*) is valuable for green manuring, and is largely used for this purpose in the orchards in Florida.—S. E. W.

Rhododendron calophyllum Franchet. By C. Leroy. (*Rev. Hort.* vol. xciv. pp. 187–190; 3 figs.).—*Rhododendron calophyllum* raised from seed collected by Wilson in Szechwan in 1904, 1908, is a hardy decorative shrub which does not flower freely until it is several years old. In cold weather the lanceolate leaves curl up and droop. The shrub thrives in sandy soil, rich in humus, and dislikes lime. The white and pink flowers are borne in clusters of 15 or 20 on the tips of the branches in March and April.—S. E. W.

Rhubarb, A Disease of. By George H. Godfrey (*Jour. Agri. Research*, vol. xxiii. No. 1, Jan. 1923, pp. 1–26; 12 plates).—A disease of rhubarb caused by *Phytophthora parasitica* var. *rhei*, is reported for the first time. It causes decay of the base of the leaf petioles, and results in complete destruction of the plant. The morphology and physiology of the fungus are similar to that of *Phytophthora parasitica* Dastur, and the author has therefore described it as a variety of that species. The fungus is a decay-producing, rather than a leaf-spot producing, organism, with intercellular mycelium and zoospores. It is capable of setting up the disease in roots of various plants (parsnip, carrot, tomato, turnip, potato, apple), but it has not been found on any other host under natural conditions.

A. B.

Rose 'Toison d'Or.' By A. Guillaumin (*Rev. Hort.* vol. xcv. p. 318; 1 col. plate).—The hybrid tea 'Toison d'Or' is one of the best yellow roses. It is vigorous in growth and has attractive foliage. The orange coloured buds are ovoid shaped and the large globular flowers are apricot-yellow shaded with orange.—S. E. W.

Roses 'Président Chérioux' and 'Sunstar.' By F. Laplace (*Rev. Hort.* vol. xcv. p. 492; 1 col. plate).—'Président Chérioux' is an improved Lyon Rose. It is very floriferous, with large ovoid buds and coral-red flowers shaded copper and orange.

'Sunstar,' a hybrid tea, is noticeable for the intense orange-yellow colour of the flowers.—S. E. W.

Salts, Alkaline in Soils. By F. S. Harris, M. D. Thomas, and D. W. Pittmann (*Jour. Agr. Res.* xxiv. No. 4, April 1923, pp. 317–338).—The toxicity for wheat of alkali salts alone and in combination have been investigated in researches on black alkali soils. When Na_2CO_3 in sand is treated with CaSO_4 or H_2SO_4 a lowering of the sodium carbonate's toxicity is evident. In heavy soils, however, sodium sulphate increases the toxicity of the carbonate. Neither NaCl nor NaNO_3 can be used in place of Na_2CO_3 in this connexion. Potassium nitrate and nitric acid are stimulating to plant growth at 1,000 parts per million, and these

substances to black alkali soils are beneficial. Calcium sulphate alone or in conjunction with sulphur and manure is the most effective corrective that was tried on such soils.

H_2SO_4 , K_2SO_4 , HCl, KCl, NaCl, Na_2SO_4 , $NaNO_3$, KNO_3 , borax, all cause increased toxicity in soils containing black alkali (Na_2CO_3).—A. B.

Second Growth Hardwood Forests in Michigan. By P. L. Buttrick (*Agr. Exp. St., Michigan Agr. Coll. Bull.* Sept. 1923).—The north-western portion of the Lower Peninsula of Michigan is known as the "hardwood belt." It is a region of low hills, gravelly soils, lakes and swamps. This bulletin (Special No. 123) does not pretend to be a complete study of the forests of the region. It is written to call attention to the problem and to answer, as far as may be, the questions which the farmer, the lumberman, the chemical woodman and the landowner are asking as to the future of the regions' once greatest resource. The towns are small, and their manufacturing and commercial life depends largely upon these farms and the products of the forest.—A. D. W.

Shrubs with Ornamental Autumn Fruit. By S. Mottet (*Rev. Hort.*, vol. xcv. pp. 390-391; 1 col. plate).—The following shrubs are recommended on account of their ornamental fruit in Autumn : *Clerodendron Fargesii*, *Callicarpa Giraldiana* var. *Rosthornii* and var. *subcanescens*, *Viburnum Davidii*. *Stranvaesia undulata* is a shy bloomer, but *S. Davidiana* has beautiful green foliage which turns red in winter and bears white flowers and red berries.—S. E. W.

Sitka Spruce : Its Uses, Growth and Management. By N. Leroy Cary (*U.S. Dep. Agr., Bull.* 1060, May 1922).—The Sitka spruce is found largely at low altitudes, and never very far from the ocean. In Alaska it is the principal tree of commerce, and in Oregon and Washington it is one of the components of the dense and luxuriant coniferous forests that blanket the humid strip of country on the west side of the coastal ranges. It was not well known in the world or national markets until an extraordinary demand for the timber arose during the war, particularly in connection with the making of aeroplanes. Within the space of a few months, in 1917, this species, which had been of decidedly second importance in the lumber industry, became one of the woods most eagerly sought. It is a tree of rapid growth, makes a large yield per acre, lends itself fairly well to forest management, and produces a wood which is of large value for many special purposes, prominent among which is the manufacture of paper. It is also the premier wood for the making of aircraft, and is specially adapted for musical instruments, veneer, and woodware. It is light, soft, straight-grained, tough, easily worked, and very strong for its weight. It is tasteless, and contains very few resin ducts. The tree attains surprisingly large proportions, up to 282 feet in height, and, in one instance, the diameter at breast-high was 16 feet. It is noteworthy that in certain parts of Alaska the heaviest stands of this wood, and of best quality, are found on limestone soils. An abundance of rainfall, frequent fogs, and temperatures moderated by proximity to the sea, are the climatic characteristics of the north Pacific coast strip where this species grows. The Sitka spruce gall aphid (*Chermes cooleyi*) is found very commonly doing injury to Sitka spruce reproduction and occasionally causing its death.—A. D. W.

Soil Moisture Movements on Freezing. By George J. Bouyoncos (*Jour. Agr. Res.* xxiv. No. 5, May 1923, pp. 427-432; 1 plate).—Evidence is shown that when a soil short of saturation is frozen, the force of crystallization tends to draw the moisture from the small capillaries and from around the soil particles as thick films into the large capillaries. When, however, the soil is wet or saturated the moisture freezes at the surface of the soil and forms capillary ice columns or thin needle-like crystals. The force of crystallization draws the water from below, which freezes at the lower end of the column and pushes the entire column upwards.

The relative distribution of capillary water is between the finer and larger capillaries, and may have a very appreciable effect upon such factors as freezing-point depression, vapour pressure, osmotic pressure, and rate of evaporation. Any treatment of the soil which will alter the relative distribution of the soil moisture would seem to affect these factors.—A. B.

Soil Moisture, Mulches and. By F. S. Harris and H. H. Yao (*Jour. Agri. Research*, vol. xxiii. No. 9, March 1923, pp. 727-742; 6 figs.).—The effective preservation of soil moisture is one of the vital problems of horticulture, and the object of mulching is to preserve a uniform degree of moisture and retain water in the soil by preventing excess evaporation. A summary of the results of various experiments for this purpose are set out below.

1. An effective mulch of 1 inch of straw is capable of preserving 60 per cent. more moisture in the soil than is retained without mulching.

2. Straw is the most efficient mulch material. Then come hay, grass, wood shavings, and manure in the order named.

3. The loss of moisture from the soil is correlated with the percentage of moisture retained by the mulch. An efficient mulch must be of material which does not absorb or retain moisture readily and which forms practically no capillary system in itself.

4. The effectiveness of mulching and cultivation increases with their depth.

5. The rate of evaporation of soils under mulch varies according to their moisture contents. Finer soils lose more water.

6. Autumn ploughing preserves more moisture than spring ploughing. Soil moisture is very variable under field conditions. Six-inch cultivation is not so efficient as 4-inch in dry farm regions.

A short bibliography is appended.—*A. B.*

Soil Reaction upon Nitrogen-fixing Power of Azobacter Flora. By P. L. Gainey (*Jour. Agr. Res.* xxiv. No. 11, June 1923, pp. 907–938).—A definite and close correlation has been established between the absolute reaction of the soil solution and the presence or absence of Azobacter in the soil. Very few soils with more acid than indicated by a H-ion concentration of 1×10^{-6} contained Azobacter, but this group of organisms was present in soils with a lower H-ion concentration. It is believed that close correlation exists between the reaction and the presence of Azobacter in laboratory media. The electrometric and colorimetric methods of determining the H-ion concentration generally agreed. Seventy-five per cent. of the 418 soils examined were found to be acid; 50 per cent. were more acid than $\text{P}_{\text{H}} 6.0$; and 50 per cent. apparently did not contain Azobacter.

A short bibliography is appended.—*A. B.*

Soil Temperature upon Development of Nodules on Roots of Legumes. By F. R. Jones and W. B. Tisdale (*Jour. Agri. Research*, vol. xxii. No. 1, Oct. 1921, pp. 17–32; 3 plates).—Preliminary studies upon the effects of soil temperature upon nodule development in alfalfa, red clover, field peas, and soy beans, due to *Bacillus radicicola*, were made at a range of temperatures from $12^{\circ}\text{C}.$ to $36^{\circ}\text{C}.$ The air temperature was uniform from $14^{\circ}\text{C}.$ to $20^{\circ}\text{C}.$

The four plants differed. Peas were dwarfed at $30^{\circ}\text{C}.$; clover poorly developed at $36^{\circ}\text{C}.$; alfalfa and soy beans were well developed at $36^{\circ}\text{C}.$ Soy beans grown in soils at $12^{\circ}\text{C}.$, $15^{\circ}\text{C}.$, $33^{\circ}\text{C}.$, and $36^{\circ}\text{C}.$ showed dark green colour in their leaves, but at the middle temperatures, $24^{\circ}\text{C. et seq.}$, the leaves were much lighter. The number of nodules formed were small at the lower and upper limits of the temperatures, and it would appear that the maximum production of the nodules occurred at $24^{\circ}\text{C}.$ The plants with the largest weight of nodules were always the palest green in colour.

The other factors of soil environment (soil moisture and concentration of the nitrates and hydrogen-ion concentration) were all taken into account, and the authors hold that variations in any of these factors are not to be regarded as having produced variations in the nodule development shown at the different temperatures in these experiments.—*A. B.*

Soil, The Value of Mineralogical Examination of. By J. Hendrick and George Newlands (*Jour. of Agr. Science*, vol. xiii. pt. 1, Jan. 1923, pp. 1–17).—The work recorded in this paper indicates that a short mineralogical examination affords a useful method of grading soils according to the reserve of bases which they contain in the form of silicates, and of distinguishing those which have little such reserve from those which have rich reserves of the principal bases required by plants.—*A. S.*

Soil, The Volume-changes associated with the Water Content in. By W. B. Haines (*Jour. of Agr. Science*, vol. xiii. pt. 3, pp. 296–310).—An account of a new and simple method of measuring the shrinkage of moist soil on drying, which at the same time gives values for the pore space and specific gravity of the soil. By means of the method the effect of alternate wetting and drying of soil in producing a good tilth is illustrated.—*A. S.*

Soils, Estimation of Colloids in. By William H. Fry (*Jour. Agr. Res.* xxiv. No. 10, June 1923, pp. 879–883).—A microscopical method for estimating the quantity of colloidal soil aggregates in soils is described, and may be used in residues left after extracting all colloid possible by repeated rubbing and washing. About 34 to 60 per cent. of the total colloidal material in the soil was in the form of colloidal aggregates not extractable by washing or rubbing.—*A. B.*

Spraying, Cost of. By W. G. Brierly (*Minnesota Hort.* vol. li. pp. 129-131).

—The cost of spraying an apple orchard with lime sulphur and lead arsenate mixture with a barrel outfit amounts to 6·37 dollars an acre for each application; this includes costs of materials, labour, interest on outfit, and depreciation. A saving is effected by using a power outfit, although the initial expense on the apparatus is heavier, but this is more than compensated for by the saving in time and labour. By substituting spray guns for spray rods three times the acreage can be sprayed a day, thus accomplishing a further economy in labour.

S. E. W.

Spraying Orchards. By A. G. Ruggles (*Minnesota Hort.* vol. li. pp. 75-78).

—The best combined insecticide and fungicide for apples and plums consists of a mixture of liquid lime sulphur 5 quarts, 1½ lb. of lead arsenate, and 50 gallons of water. A high pressure is used. The spray is applied to apples when the flower-buds show pink, again when the petals drop, and the operation is repeated about the end of June and the third week in July. Plums are sprayed before the blossom opens, again when the fruit is the size of a pea, and again about the beginning of July, with a final application when the plums show colour.

To destroy aphides spray with nicotine sulphate, ½ lb.; soap, 2-3 lb.; and 50 gallons of water.—*S. E. W.*

Sprays and Dips, The Relation of Hard and Alkaline Waters to the Preparation and Dilution of. By E. R. de Oug (*Journ. Econ. Entom.* vol. xv. pp. 339-345, Oct. 1922).—Soluble salts in water are a source of danger in the preparation or dilution of sprays.

- (1) By chemical reactions with the insecticidal or fungicidal materials.
- (2) By physical reactions, such as the breaking down of emulsions.

In the author's tests a standard soap solution was used to determine the hardness of water. Detailed analyses and tables showing the salts present in various samples of hard and soft water are given, and the conclusions drawn are:

Hard and alkaline waters form dangerous combinations with many forms of insecticides.

Softening of hard water with chemicals is only partially successful, though water-softening plants with a capacity to supply domestic purposes and a spraying outfit can be installed at a fairly low cost.

Insecticides compatible with the salts commonly found in waters can, in some cases, be substituted—e.g. basic arsenate of lead instead of the acid (standard) type; arsenical dips in lieu of cresol preparations; and the use of stable oil emulsions which are made for use in waters.

It is also suggested, where practical, that dusting materials might make the user independent of the type of water found locally.—*G. W. G.*

Stem-ringing and Transfer of Nitrogen and Ash Constituents. By Otis F. Curtis (*Amer. Jour. Bot.* x. No. 7, July 1923, pp. 361-382; 7 tables, 1 fig.).—Experiments to show the effects of ringing the stems of privet, lilac, and peach were made by the author, and the results recorded are as follows: A ring hinders the movement of nitrogen and ash constituents upwards into the leaves above the ring under all conditions of growth in spring or summer.

When sodium nitrate, with or without nutrient salts, is added to the soil, the nitrogen and ash contents of the leaves from unringed stems increase to a much greater extent than do those of the leaves from ringed stems. Analyses of the stems showed a lesser content in the ringed stems than in the unringed stems. The experiments seem to show that nitrogen and other nutrients are carried chiefly in the phloëm.—*A. B.*

Sterility in Plants. I. The Physiology of Incompatibilities. By A. B. Stout; II. Pollen and Seed Sterility in Hybrids. By B. M. Davis; III. Self- and Cross-Sterility. By E. M. East; IV. Sterility and Horticulture. By M. J. Dorsey (*Amer. Jour. Bot.* vol. x. No. 9, Nov. 1923, pp. 459-484).—There are four papers in this symposium and the several aspects of the problem of sterility in plants are presented by the four authors.

In the first paper, the physiology of incompatibilities in fertilizations are dealt with under two groups of phenomena—(a) the general and characteristic failures of cross-fertilization *between* different species, and (b) the physiological limitations to free and general fertilization *within* species. The first involves species specificity and are expressed by the interaction between the nuclei of the ovule and the pollen of different species; the second with the self-incompatibility in the germ cells of a single individual. For example, in the species

Brassica pekinensis self-incompatibility of a plant or family of plants may be changed by a cultural treatment which reduces vegetative vigour. Less than 10 per cent. of a total of 326 plants were highly self-compatible. There appears a direct and decided physiological correlation between vegetative vigour and the functional properties of organs of fertilization.

The second paper deals with pollen and seed sterility in hybrids, and details instances where the sterility results from failure to develop gametes and also where the gametes are unable to unite. The causes may be due to secretions unfavourable to germination of the pollen grains and the slowness of growth of the pollen tube in examples on *Nicotiana*, *Zeamaia*, and *Datura* as well as *Oenothera*. Zygotic sterility is very common amongst plant hybrids, and it is suggested that lethal factors as genes in the chromosomes affect the sterility of plants in many families of the Compositæ.

The third paper deals with the genetics of self- and cross-sterility in various species of the *Nicotiana* genus. The behaviour of reciprocal crosses is the same. If the pollen of A is sterile on B, then the pollen of B is sterile on A. The factors which govern the behaviour of self-sterile plants are strictly inherited and are transmitted in accordance with a definite Mendelian mechanism. The genes which govern the behaviour of these plants in crosses are numerous. About fifteen classes are genetically distinct from each other. This is proved by the fact that each class is fertile with every other class.

The fourth paper gives an account of sterility and horticulture. The viewpoint of the horticulturist is discussed from the setting of the fruit and the failure or success of the crop. The first consideration is that variety is the unit in horticulture and the second is the ratio between the number of flowers produced and the number of fruit set. In apple and plum a set of 5 to 10 per cent. of the full blossom is sufficient for a crop, but in the grape, strawberry, currant and raspberry all the blossoms may set as fruit. Again, fruit setting is complicated by the fact that fruit-bud initiation and development accompany fruit production in some of the fruits. Where fruit buds are formed before dormancy, winter frosts may exceed all other factors in reducing the crop of peach, cherry, and plum. When planted alone or pollinated with its own pollen a variety is self-fertile or self-sterile. In the apple and the pear self-sterility or self-fertility is not so well defined, but in the peach sterility is not an important commercial problem, while in the cherry sterility is acute, especially in the sweet cherry. The sterility of strawberries is well known when planted alone.

Unfavourable weather causes more crop failures than any other cause. Self- and cross-sterility in apple, cherry, plum, results from slow pollen tube growth, and cultural treatment has also a profound effect upon the crop.—A. B.

Stone Fruit Fungi Influenced by Spraying. By Chas. Brookes and D. F. Fisher (*Jour. Agr. Research*, vol. xxii. No. 9, Nov. 1921, pp. 467-478; 6 figs.).—Orchard spraying has reduced amount of *Monilia* (brown rot) on sweet cherries, in transport and storage, from 24 to 6 per cent. In similar experiments with Italian prunes there was an average of 28 per cent. of brown rot on unsprayed fruit and 7 per cent. on sprayed fruit. Spraying or dusting with sulphur has little or no effect upon control of *Penicillium* and *Rhizopus* in transport or storage of stone fruits. The occurrence, apparently, of these fungi is influenced by presence of bruises or skin punctures.

Unsprayed fruits require refrigeration more than sprayed fruits.—A. B.

Stone Fruit Fungi, Temperature Relations of. By Chas. Brookes and J. S. Cooley (*Jour. Agr. Research*, vol. xxii, No. 9, Nov. 1921, pp. 451-466; 24 figs.).—The authors find that a temperature of 10° C. holds *Monilia* in check for one or two days, and *Rhizopus* in check for three days. A temperature of 7½° C. controls *Monilia* for three days and *Rhizopus* for six or more days. Even lower temperatures control *Monilia* for four to six days.

Low temperatures have resulted in less inhibition of growth with *Monilia* when grown on peaches than when grown on potato dextrose agar, and a greater inhibition with *Rhizopus* when grown on peaches than when grown on potato dextrose agar. Both fungi grow at lower temperatures on ripe fruit than on green fruit.

Peaches stored at 10° C. after inoculation have been three to five days slower in developing rots than those delayed one day at 25° C. before storing at 10° C. Peaches stored immediately at 7½° C. have been five days slower in developing brown rot than those delayed one day at 25° C. before storing at 7½° C.—A. B.

Street Trees, Planting and Care of. By F. L. Mulford (*U.S. Dep. Agr. Bull.* 1209, Aug. 1921).—The kind of tree to grow on any street depends upon

a large number of conditions, amongst which are range of temperature, moisture supply both in atmosphere and soil, type and character of soil, amount and character of street and side-walk coverings, width of street, height of buildings, and adaptability of the different kinds of trees to the various conditions. Nursery-grown trees, averaging from 10 to 12 feet high, and that have been transplanted at least every two years while in the nursery, are preferable. A hole, 6 feet long and 3 feet wide and deep, and from 2 to 3 cubic yards of soil should be provided for each tree.—A. D. W.

Sugar Beet, Canker Dry-Rot of. By B. L. Richards (*Jour. Agr. Research*, vol. xxii. No. 1, Oct. 1921, pp. 47-52; 6 plates).—The author describes a hitherto unknown root canker of the sugar beet due to *Corticium vagum* B and C. The disease forms brown circular lesions on the rind and contains mycelium and black sclerotia of the *Corticium vagum* B. and C. It causes wilting of the leaves, which soon turn brown and die. The point of attack is often at the apex of the root, and the disease produces concentric rings of canker, which may encircle the whole root. The canker gradually penetrates into the tissues of the root, and this is converted into a dry brittle shell.—A. B.

Sulphates and Plant Growth. By H. G. Miller (*Jour. Agr. Research*, vol. xxii. No. 2, Oct. 1921, pp. 101-110).—The author shows that sodium sulphate and calcium sulphate have a beneficial effect on nodule development and nitrogen assimilation of the red clover grown upon sterilized soil. When a soil of high sulphur content was used, the nitrogen content in clover of the third and fourth crop was lower on the control pots than where sulphur, CaSO_4 , or Na_2SO_4 were applied.

Rape plants assimilated a large amount of sulphur, although the presence of sulphates reduced the yield compared with the control soil cultures. Sulphates plus nitrates caused increased yields compared with those of nitrate alone.—A. B.

Sulphur in relation to Soil Fertility. By W. L. Powers (*U.S.A. Exp. Sta., Oregon, Bull.* 199, 1923).—Applications amounting to 1000 lb. per acre annually during 10 years have given continued marked increase. The application of 100 lb. per acre showed an increase for 3 to 5 years, and on heavy soil for longer. The use of sulphur beyond the amount needed to meet the absolute deficiency has tended to aggravate soil acidity in humid soil.—C. H. H.

Sulphur Oxidation by Micro-organisms in Black Alkali Soils. By S. A. Waksman, Clara H. Wark, J. Joffe, and Robt. L. Starkey (*Jour. Agr. Res.* xxiv. No. 4, April 1923, pp. 297-306).—The accumulation of sodium carbonate in the soil (black alkali soil) causes sterility. Irrigation, which washes out the carbonates, brings about a temporary relief, but if the Na_2CO_3 can be converted into Na_2SO_4 (white alkali) much more satisfactory results can be obtained. The use of sulphur in presence of sulphur-oxidizing bacteria (*Thiobacillus B.* and *T. thio-oxidans*) will result in a transformation of the black alkali soil to white alkali soil.

The final reaction of the soil depends on the quantity of sulphur used and the length of time which the sulphur is in contact with the soil. In the presence of two bacteria, one of which can act upon sulphur under alkaline conditions, while the other rapidly oxidizes sulphur under acid conditions, the speed of the reaction is greatly hastened.—A. B.

Tobacco Leaf-spot Disease. By James Johnson (*Jour. Agr. Research*, vol. xxiii. No. 6, Feb. 1923, pp. 481-493; 4 plates).—A bacterial leaf-spot disease of tobacco has been studied by the author for the last five years in Wisconsin. It shows itself as a series of round, brown rust-coloured spots, less than half an inch in diameter, but frequently running together to form large lesions. The causal organism is a bacterial organism to which the name *Bacterium melleum* n.sp. is given. Its chief characteristics are $1.8 \mu \times 0.6 \mu$, with one to seven flagella, orange-yellow in colour, liquefies gelatine, turns litmus milk alkaline; gives no acid with dextrose, lactose, and saccharose broth; causes fluorescence honey-yellow on potato dextrose agar; and attacks various species of *Nicotiana* and tomato.—A. B.

Tomato Fusarium Wilt and Hydrogen-ion Concentration. By E. C. Sherwood (*Amer. Jour. Bot.* vol. x. No. 10, Dec. 1923, pp. 537-553; 1 plate).—To determine effect of soil reaction on the development of plant diseases caused by soil organisms, a knowledge of the materials bringing about the reaction is essential, and the colorimetric method of hydrogen-ion estimation in soil extracts affords a means of accurately determining the reaction of the soil before and after such

materials are added. It was found that the highest percentage of wilt always occurred in the most acid soils of the series. The percentage of wilt decreased uniformly as the hydrogen-ion concentration of the soils decreased, until approximately $p\text{H}$ 7·4 was reached. Plants developed poorly in soils more alkaline than $p\text{H}$ 7·4.

Culture experiments with *Fusarium lycopersici* in nutrient solutions adjusted to hydrogen-ion concentrations ranging from $p\text{H}$ 1·8 to 8·4. No germination of the spores occurred in solutions adjusted to $p\text{H}$ 1·8. The fungus grew well in concentrations from $p\text{H}$ 2·8 to 8·4, and from $p\text{H}$ 3·6 to 8·4 the growth was accompanied by greater acidity.—A. B.

Tomato Fusarium Wilt and Soil Moisture. By Ed. E. Clayton (*Amer. Jour. Bot.* vol. x. No. 3, March 1923, pp. 133–147; 3 plates).—Tomato plants grown in pots of sterilized soil inoculated with a spore suspension of *Fusarium lycopersici*. The moisture content ranged from 13 to 35 per cent., the last representing complete saturation.

The plants in low moisture content soil (13 to 19 per cent.) were very resistant to the disease, while the plants in saturated soil were also immune from attack. The shortage of moisture sufficiently severe to check the vegetative vigour of the host also proportionally decreased the disease. Rapidly growing plants when the temperature was raised 5° to 10° C. were soon attacked by the wilt, but if the soil was allowed to become dry rapidly growing succulent plants became disease-resistant. Plants in saturated soils were immune to attack, but if the moisture content was lowered the disease soon developed. This immunity of saturated soil plants was correlated with the practical absence of nitrates in the host tissues.—A. B.

Tomato Wilt caused by Fusarium and Temperature Conditions. By Ed. E. Clayton (*Amer. Jour. Bot.* vol. x. No. 2, Feb. 1923, pp. 71–88; 4 plates).—This paper deals with (1) the relationship of soil temperature to the occurrence of tomato wilt caused by *Fusarium lycopersici*, and (2) the effect of combinations of different soils and temperatures upon the disease.

The fungus in Petri dish cultures exposed to temperatures 4° to 38° C. showed best growth at 28° C. though abundant growth occurs at temperatures 18° to 31° C. In three experiments soil temperature alone varied, the soil being first sterilized and then inoculated with *Fusarium lycopersici*. The soil temperatures had a range of 14° to 35° C.; the period of growth was four to six weeks. The optimum soil temperature for the disease was found to be 28° C., while at temperatures 33° C. or above and 21° C. or below the disease was inhibited.

Two experiments were conducted in which air and soil temperature were controlled. For this work, the air in three greenhouses was called cool (17° C.); warm (27° C.); and hot (33° C.). Soil temperature tanks were placed in the houses and regulated at 17° C., 27° C., and 35° C., thus permitting of nine combinations of air and soil temperatures. In two of these combinations (air 27° C., soil 27° C., and hot air 33° C., warm soil 27° C.), the disease made a rapid development. If soil was too cool (17° C.) or too warm (35° C.) the disease did not develop, even at optimum air temperature. If the air was kept too cool (17° C.) and the soil temperature was optimum (27° C.), heavy infection occurred in the root and extended up the basal part of the stem. The most favourable temperature for the development of the fungus was a soil temperature of 27° C. and an air temperature of 28° C.

Evidence appears to show that the wiltings and death of the plants attacked by *Fusarium* disease is due to toxic action rather than plugging of the xylem by the fungus hyphae.—A. B.

Trees for Town and City Streets. By F. L. Mulford (*U.S.A. Dep. Agr.*, March 1922).—Success in tree planting on town and city streets depends upon three main factors—proper conditions for growth, timely and intelligent care, and selection of proper varieties. In this bulletin are indicated the kinds of trees suited to different types of streets, and to different regions. As a rule, trees native to the locality that have been successfully grown in other cities should be given the preference. When a choice must be made between untried and native trees and those tested in a city or town under different soil or climatic conditions, it is better to give the native trees the first trial.—A. D. W.

Tulip Bulbs, The Production of. D. Griffith (*U.S.A. Dep. Agr.*, *Bull.* 1082, Oct. 1922; plates).—Recommendations are made upon methods of growing tulips for bulb production, grading and marketing.

The structure of the bulb is described ; the preparation of the soil, planting, harvesting, and storing are dealt with in detail. The increase also of different varieties is illustrated, and comparative tables show the normal increase in size and number of bulbs in many varieties. Unfortunately, the tables given are by no means clear. The effects of early maturity and of maintaining a fairly high degree of temperature during storage upon early flowering in the succeeding year are commented upon.—F. J. C.

Walnut and Hickory, Curculios that attack the Young Fruits and Shoots of. By Fred. E. Brooks (*U.S. Dep. Agr., Bull.* 1066, June 1922).—Several species of beetle, nearly related to the common plum curculio (*Conocephalus nenuphar*) attack the immature fruits, tender shoots, and leaf petioles of walnut and hickory. The injury inflicted by this insect consists of feeding punctures made by the adults in the nuts, tender tips, and leaf petioles, and the burrows of the larva in the nuts and new growth of various species of walnut. The most serious loss has been to the Japanese walnut, although trees of the Persian walnut have suffered to some extent. The butternut curculio has but one generation annually, and passes the winter in the adult stage. The larvæ are whitish or dirty white, with brown head, and blackish mandibles. It has been found that spraying walnut trees with lead arsenate, at a strength of 6 lb. to 50 gallons of water, is an effective method of controlling the butternut curculio.—A. D. W.

Walnut Culture in California. By L. D. Bachelor (*Coll. of Agr. Univ. of Cal.*, June 1921).—The Persian walnut, or, as it is more commonly known, the English walnut, may be seen growing in nearly every county in the State of California. The original walnut plantings in California were "hard-shell" and "paper-shell" seedlings. From these early plantings the next generation of nuts produced a nut commonly known as the "Santa Barbara soft-shell." The majority of those at present cultivated consist of this variety. The average yield varies from year to year, but a ten years' yield for bearing orchards is approximately 800 lb. per acre. Harvesting, washing and curing, packing, bleaching and grading, are all described, about 85 per cent. of the entire produce being sold by the California Walnut Growers' Association.—A. D. W.

Water Supplying Power of a Soil, Estimation of, by Soil-points. By F. Hardy (*Jour. of Agr. Science*, vol. xiii. Pt. 4, pp. 355-360).—Attention is drawn to Mason's modification of Livingston's soil-point method of directly estimating the water-supplying power of a soil *in situ*. Mason used ordinary blacklead writing pencils as soil-points. This method, heretofore tested only in the laboratory, has been employed by the writer in an ecological field study. Details of the procedure adopted are described, and the reliability of the method is indicated by the presentation of a series of mean results with their corresponding probable errors. It is concluded that the method is practicable and that it should prove of considerable usefulness to workers in ecology.—A. S.

Wireworms, Destruction of. By A. Roebuck (*Jour. Min. Agric.* vol. xxx. No. 11, Feb. 1924, pp. 1047-1051).—A census was taken as to the number of wireworms in permanent grass and in arable land, and the results showed that they were four times as numerous in permanent pasture as in cultivated land.

The depth distribution varied with the land. In grass land the wireworms were near the surface, and no evidence was found that a downward movement was made during cold weather, whilst in arable land the larvæ were most numerous at 3-4 inches deep, and rarely below 9 inches.

The crop exerts considerable influence on local movements, for with cereals the numbers are evenly distributed, whereas with drilled crops, especially white turnips, they collect in large numbers along the rows.

Cultivation has a marked effect on the numbers, and five years' cultivation appeared to be sufficient to reduce the numbers to a negligible factor.

Amongst cereals, oats proved to be the least affected crop, and barley the worst attacked. Swedes, turnips, and mangels are all badly attacked, and are unsatisfactory for growing on land which is known to contain large numbers of wireworms.

Beans and peas are safe crops, provided that the former crop is not dibbled very thinly and the latter is not drilled thinly in rows.

Potatos usually grow well and provide an excellent crop for planting on freshly ploughed-up land, which is usually sour.

Amongst the cabbage tribe, kales are best to grow, as they can be left unattended.—G. F. W.

Woodlice in Glasshouses. By E. R. Speyer (*Jour. Min. Agric.*, vol. xxx, No. 11, Feb. 1924, pp. 1042-1047; 5 figs.).—The three chief species are *Armadillidium speyeri* Jackson, *A. pictum* Br. and *A. vulgare*; the first two are practically confined to cucumber houses, and the latter species is more often found in the cooler tomato and peach houses.

A. vulgare, the common pill woodlouse, hibernates by burying itself to a great depth in the ground, and *A. speyeri* and *A. pictum* remain more or less active if the soil is not removed from the houses. The damage to plants consists of (1) biting through the stems of tomato plants near the soil level; (2) eating pear-shaped holes in the cotyledons and lower leaves; (3) eating the petals of carnation flowers; and (4) removing the bark from the branches of peach trees.

Control measures in winter consist of (a) watering inside borders with hot water (140° F.); (b) spraying borders, walls, and woodwork with cresylic acid (1 gallon), potash soft soap (8 lb.), naphthalene (½ lb.), using 2 pints of this mixture to 12 gallons of water. In summer, remedial measures include (c) baiting with oatmeal (10 parts), glucose (2 parts), potassium bichromate (1 part), and water (10 parts); (d) pot trapping with common straw with the addition of 10 per cent. glucose; (e) trapping with hollowed-out sections of red beetroot or mangel, using one-half to every four plants.—*G. F. W.*

Yema Budded Vine. By H. L. Manuel (*Agr. Gaz., N.S.W.*, vol. xxxiv, pp. 449-451; 2 figs.).—The union made by the Yema method is superior to that of the springfield or bench graft. Usually the Yema budded vine forms a strong stem at the first pruning.—*S. E. W.*

NOTE.

A Fellow is much interested in nut cultivation in this country, and especially in that of *Juglans* species and their varieties, and would be glad to get into touch with others who may be similarly interested, with a view to exchange of information and experience. Please address: H. Spence, Esq., F.R.H.S., The Red House, Ainsdale, Southport.

EXTRACTS FROM THE PROCEEDINGS
OF THE
ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETING.

JANUARY 16, 1923.

The Rt. Hon. The Lord LAMBOURNE in the Chair.

Two hundred and seven Fellows were elected, and nine Societies affiliated.

GENERAL MEETING.

JANUARY 30, 1923.

C. T. MUSGRAVE, Esq., in the Chair.

One hundred and twenty-eight Fellows and four Associates were elected, and six Societies affiliated.

A lecture was given by Mr. W. J. Dowson, M.A., on "The Wilt Disease of Michaelmas Daisies."

ANNUAL GENERAL MEETING.

FEBRUARY 13, 1923.

The Rt. Hon. The Lord LAMBOURNE in the Chair.

The Minutes of the last Annual General Meeting were read and signed. One hundred and fifty-nine Fellows and six Associates were elected, and seven Societies affiliated.

Lord Lambourne reviewed the work of the Society during the past year, and moved the adoption of the Council's Report. The motion was seconded by the Treasurer, Mr. Musgrave, who drew attention to the various points of importance in the annual balance-sheet.

The Chairman then called upon Mr. Cuthbertson to say something about the Wisley Garden and the adverse criticism which had appeared in the Press.

It was suggested by one Fellow that in future the heading "Any other business" should appear on the agenda, and the suggestion was at once accepted by the Chairman.

The following having been duly proposed and seconded as President, Treasurer, Secretary, Members of the Council, and Vice-Presidents, they were declared elected by the Chairman, under By-law 74, as no other names had been proposed :

<i>As President.</i>	<i>Proposed by</i>	<i>Seconded by</i>
The Rt. Hon. The Lord LAMBOURNE, P.C., C.V.O., V.M.H.	Mr. C. G. A. Nix.	Mr. H. B. May.

ii PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

As Treasurer.

Mr. C. T. Musgrave. *Proposed by* The Rt. Hon. The Lord Lambourne. *Seconded by* The Rev. W. Wilks.

As Secretary.

Mr. W. R. Dykes, M.A., L.-es-L. Dr. A. W. Hill. Mr. W. A. Bilney.

As Members of Council.

Mr. E. A. Bunyard, F.L.S. Mr. C. G. A. Nix. Mr. C. T. Musgrave.
The Hon. H. D. McLaren. The Rt. Hon. The Lord Lambourne. Mr. W. Cuthbertson.
Sir William Lawrence, Bt. The Rev. W. Wilks. Mr. G. W. E. Loder.

As Vice-Presidents.

The Duke of Bedford,
K.G., F.R.S. }
The Duke of Portland,
K.G., P.C., G.C.V.O. }
The Rt. Hon. Lord Gren-
fell, F.M., G.C.B.,
G.C.M.G. }
Sir George Holroyd,
K.C.V.O., C.I.E. }
Sir James Knott, Bt. }
Sir John T. D. Llewelyn,
Bt., D.L., J.P., V.M.H. }
The Rt. Hon. Lord Ulls-
water, P.C. }
Sir Daniel Morris,
K.C.M.G., V.M.H. }
Sir David Prain, C.M.G.,
F.R.S., V.M.H. }
Sir Harry J. Veitch,
V.M.H. }
The Hon. Vicary Gibbs,
V.M.H. }
Mr. J. C. Williams. }

The Rt. Hon. The Lord Lambourne. Mr. C. T. Musgrave.

As Auditor.

Mr. Alfred C. Harper. Mr. C. T. Musgrave. The Rt. Hon. The Lord Lambourne.

The Victoria Medal of Honour was handed by the President to Mr. C. G. A. Nix, whom he warmly thanked for the work that he had done for the Society; to Mr. Joseph Lowe, to Mr. A. C. Bartholomew, and to Mr. R. W. Wallace.

The Lawrence Medal was handed to Mr. H. J. Jones of Lewisham, for his exhibits of Chrysanthemums during the year 1922.

The Veitch Memorial Medals were handed to Mr. W. Bean, for his work on trees and shrubs, and to Dr. Lloyd Praeger, in recognition of his work on Sedums and *Sempervivums*.

Mr. Wilks then proposed a vote of thanks to Lord Lambourne for presiding, which was carried with acclamation.

REPORT OF THE COUNCIL FOR THE YEAR 1922.

1. **The Year 1922.**—The Society has continued to prosper throughout the year. The number of its Fellows has increased steadily and its work has grown in every direction.

2. **The Botanical Magazine.**—Botanists and gardeners alike will be glad to know that the Society now owns the copyright of Curtis's *Botanical Magazine* and the stock of the old volumes from 1845 down to 1920. The Council has undertaken to continue the publication of this magazine, and the first parts of the volume for 1922 have already appeared and others are in active preparation.

3. **The Meetings in 1922.**—The Fellows of the Society and other visitors to the Hall have been struck with the continued excellence of the exhibits at the Fortnightly Meetings. There is no doubt that the standard reached by exhibitors has never been higher nor the exhibits themselves more effectively staged.

4. **The Summer Show.**—Chelsea was a great success, favoured as it was by fine weather. The catering was not as satisfactory as could have been wished, but the Council is leaving nothing undone to ensure that it shall be better in future. Everyone will, however, realize how extremely difficult it is to provide a thoroughly efficient temporary staff for such occasions and to gauge the number of meals that will be served, when the demand depends on such a fickle factor as the weather.

5. **Great Autumn Show.**—This took place at Holland Park Skating Rink, and it was agreed on all hands that the exhibits formed a display such as has seldom been seen before in one building. The experiment proved that even that Hall provides inadequate space, both for exhibitors and visitors. Our difficulty is that there is apparently no larger accessible Hall in London, except Olympia, and Olympia is monopolized in the Autumn months by the Motor Exhibitions. The Council has decided to hold a Show on similar lines at the Skating Rink on October 2 to 4, 1923.

6. **The Journal.**—Fellows are reminded that the JOURNAL is now only sent to those who fill up the form asking that it should be sent to them. In former days many households received several copies, and it was in order to avoid waste that the Council decided to ask each Fellow whether he wished a copy sent to him or not. Rather more than 5,000 Fellows have asked that the JOURNAL should be sent to them.

7. **Obituary.**—By the death of Sir Isaac Bayley Balfour the Society has lost one of the most eminent of its Vice-Presidents. His profound knowledge of botany and his supreme skill as a cultivator enabled him to make Edinburgh unique among Botanical Gardens, and he was ever ready to place both his knowledge and the resources of his garden at the disposal of other workers. The Society will always owe him a deep debt of gratitude for his help and advice in developing its scientific work, and remember his devotion to horticulture.

The name of Elwes has long been well known amongst all lovers of garden plants, and the death of Mr. Henry Elwes of Colesborne deprives horticulture of one of its most prominent figures. No man has a wider knowledge of trees and plants as they grow in their native wilds and few are as well fitted as Mr. Elwes to record their knowledge in such admirable form as his books on Lilacs and on Trees. It will be to the lasting credit of Mr. Elwes that it was on his initiative that the copyright of Curtis's *Botanical Magazine* was purchased by a group of enthusiastic gardeners and presented by them to the Society, thereby ensuring its continuance as the foremost botanical and horticultural publication.

By the death of Sir Albert Rollit the Council has lost one of its oldest members, whose legal knowledge and business acumen enabled him to render good service to the Society. Mr. Reginald Cory has been elected to fill the vacancy on the Council.

iv PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

By the death of Mr. S. T. Wright, the Superintendent of the Wisley Garden, the Society has lost one of its oldest servants, whose genial personality had gained for him a special position with all who came in contact with him. To the last he was always ready to welcome Fellows to Wisley, and for years the Society's Shows owed their smooth working to his ready help.

His successor as Superintendent of the Society's Shows, Mr. W. Bisset, has also passed away. His popularity among the exhibitors was remarkable and his skill in overcoming the difficulties which must arise in their organisation quite exceptional.

8. Conifer Conference.—It has been decided to hold a Conifer Conference in 1924, but details are still under discussion and will be announced as soon as a decision has been reached.

9. Veitch Memorial Trust.—This Trust was founded in 1870 in memory of James Veitch, of Chelsea, founder of the famous firm. The object of the Trust was to provide medals and prizes for the advancement and improvement of the science and practice of the cultivation, or for the successful cultivation, of plants, flowers, trees, fruit and vegetables, and otherwise for the advancement of the science and practice of horticulture. The Trust has recently been transferred by the Trustees, with Sir Harry Veitch at their head, to the Council of the Society, which has awarded the Veitch Memorial Medal in silver and a prize of £50 both to Mr. W. J. Bean in recognition of his work on trees and shrubs, which resulted in the publication of "Trees and Shrubs Hardy in the British Isles," and to Mr. Lloyd Praeger for his work on Sedums and to assist him in his proposed work on Semperferviums.

10. The Lindley Library.—During the year 85 books have been added to the Library and considerable progress has been made by binding 167 volumes.

Fellows are invited to present books to the Library and to give the Society the first offer of any they may wish to sell.

They are also invited to make more use of the facilities of this excellent horticultural library, from which they are at liberty to borrow the great majority of the volumes. The Library now remains open on Show Tuesdays until the close of the Show.

11. Victoria Medal of Honour.—Vacancies among the sixty-three holders of the V.M.H., caused by the deaths of Sir Albert Rollit, Mr. H. J. Elwes, Mr. S. T. Wright, Mr. J. H. Godadre and Mr. John Seden, have been filled by the election of Mr. A. C. Bartholomew, Mr. C. G. A. Nix, Mr. R. W. Wallace, Mr. J. Lowe and Mr. A. K. Bulley.

12. The Lawrence Medal.—The Lawrence Medal has been awarded to Mr. H. J. Jones, of Ryecroft Nurseries, Hither Green, for his groups of Chrysanthemums.

13. Increase in Membership.—The following table shows the increase in the number of Fellows of the Society during 1922 :-

LOSS BY DEATH IN 1922.				FELLOWS ELECTED IN 1922.			
Life Fellows	..	..	..	12	Life Fellows	..	..
4 Guineas	..	..	..	2	4 Guineas	..	..
2	"	..	..	72	2	"	..
1	"	..	..	58	1	"	..
				—			
				144	Associates..	..	..
					Affiliated Societies	..	..
							98
LOSS BY RESIGNATION, &c.							
4 Guineas	..	..	..	4			2,640
2	"	..	..	250	Deaths and Resignations	..	992
1	"	..	..	520			—
Associates	..	..	..	31	NUMERICAL INCREASE	..	1,648
Affiliated Societies	..	..	..	43			—
				848	Total on November 15, 1921	16,494	
Total Loss..	..	..	..	992	Total on November 14, 1922	18,142	

14. **Committees, etc.**—Finally, the Council wishes to express its gratitude to those Fellows of the Society who have served on one or other of its Committees and without whose help the work could not be carried on. The Council also owes its thanks to the Press for the way in which it has supported the work of the Society and kept it before the public.

WISLEY REPORT.

15. **Visitors.**—Visitors to Wisley during the past year have been more numerous than in any previous year, and a feature has been the increased number of parties of horticulturists particularly interested in the vegetable trials and the varieties of the more commonly grown flowers. The hourly omnibus service now running between Kingston Station and North Street, Guildford, has made access to the Garden easy from all parts.

16. **The Staff.**—The loss the Society in general, and Wisley in particular, has sustained by the death of Mr. S. T. Wright, Superintendent first of Chiswick and then for seventeen years of Wisley, has already been referred to. The Fruit and Vegetable Committee has erected a sundial to his memory in the Garden, and a portrait to hang in the Laboratory is being presented by the R.H.S. Gardens Club. Mr. A. Simmonds, N.D.H. (late Major, Machine Gun Corps), an old Wisley student, has been appointed Assistant Director and takes up his duties in the New Year, and these are the only changes in the personnel of the staff.

17. **School of Horticulture.**—The School of Horticulture remains full. The training offered is essentially one intended to fit those who have passed through it to follow a horticultural career, and to that end a thorough training in practical gardening is given and is supplemented by instruction in the fundamental principles upon which good cultivation is based. Eleven students have completed their two years' course during the year.

18. **Rose Trial Garden.**—The Council having failed to secure the active co-operation of the National Rose Society has determined to carry out the plan of testing roses at Wisley without its assistance. Cordial help has been offered by many interested in the matter, and a start has already been made on the new land at Wisley. All types of outdoor roses will be grown, and new varieties tested against well-known ones, as they become available. The collection of wild roses from different parts of the world now growing near the site of the Trial Garden will also be extended as opportunity offers. The further help and interest of our Fellows in the scheme will be cordially welcomed.

19. **Fruit Testing for Commercial Value.**—An arrangement has been entered into whereby varieties of hardy fruit will be tested on a sufficient scale to ascertain their probable value for commercial growing. It is satisfactory to know that this scheme will be aided by a substantial grant from the Government Development Fund, and will be administered by a Committee half appointed by the Council and half by the Ministry of Agriculture; the work will, in the first place, be carried out at Wisley by the staff of the Gardens, and in the course of time a considerable area will be required. The scheme has already been set going, and the land to be first used adjoins that set apart for the rose-trial grounds. Further details of the scheme will appear in the JOURNAL.

20. **New Land.**—In order to be in a position to carry out these two schemes the tenancy of Deers Farm has been determined and the land not at the moment required for them is being farmed. The taking over of this farm has also enabled the Council to provide a playing-field for the students and staff, as well as to extend the green-manuring experiments.

21. **The Garden.**—The plans for improving the water supply to part of the Garden alluded to in the last Report have now been carried out and will enable us to maintain a constant supply in the ponds and ditches of the wild and rock gardens. Further progress has been made in improving the surroundings of the Laboratory, and it is hoped to continue this work during the present winter. Considerable additions have been made to the planting of shrubs and trees in the seven-acre field, and the work in this part of the Garden is still extending. The planting done during the past three years has succeeded beyond expectation considering the adverse seasons which have passed. Many of the Farrer and Forrest plants are proving fine acquisitions and notes upon some of them have appeared in our JOURNAL. The seeds obtained as a result of the two Mt. Everest

expeditions are very scanty, and at present not very promising, but it is too early to speak definitely regarding this. Many minor alterations have been made in the Garden, but much still remains to be done to remove traces of the enforced neglect of parts during the war and of the ravages of the drought of 1921.

22. Plant Distribution.—Again, as last year, several forms reached us requesting plants, but unsigned and containing no indication of their origin. One or two have been traced, but Fellows would greatly facilitate the heavy work involved by filling up properly the forms of application for plants and by otherwise observing the regulations printed on those forms.

23. Garden Trials.—The Trials announced in the Calendar for 1922 have all been satisfactorily carried out and have been a source of great interest and attraction to visitors. Most have been reported upon in the JOURNAL, and particular notice should be taken of the reports on Beet drawing attention to a neglected method of using these valuable vegetables, and of Antirrhinums under glass as a means of beautifying cold greenhouses in spring. The improvement in trueness of stocks of vegetables was again markedly evident this season.

24. Experimental Work.—The green-manuring experiments have now completed their third year, and it will be possible soon to draw some general conclusions. A preliminary report was published in the JOURNAL in 1922. Dr. Darbshire has also carried out some interesting experiments on the comparative value of spent hops and pig manure, etc. A report on Michaelmas Daisy Wilt by Mr. Dowson is in the press, and progress has been made with other experimental work mentioned in our last Report. The result of a comparison by Mr. Rawes of trees raised from parents of known fruiting history has also been published. The vines raised from crosses made by Dr. Keeble have now been reduced to a few fairly promising seedlings which will be grown on.

Following the precedent of recent years an extensive exhibition illustrating part of the experiment work at Wisley was set up at Chelsea, and an information bureau was organized in connexion with it by the Wisley Staff, strengthened by Mr. C. R. Fielder, the Society's Garden Adviser. The number of visitors to the exhibit was very large and inquiries on all sorts of subjects were very numerous. The value of the work and the opportunity of gaining information regarding it were evidently greatly appreciated by the visiting Fellows.

25. Gifts.—A large number of gifts of plants and seeds for the Garden, of books for the Garden Library, and also some of money, have been received, and the Council tenders to the donors its grateful thanks. Among the gifts particular mention may be made of two paintings of plants for the Laboratory from H.R.H. Princess Louise, Duchess of Argyll, herself the Artist, and another from an anonymous donor of money to be applied to the framing of portraits of eminent horticulturists to hang upon the walls of the Laboratory.

26. Acknowledgments.—The Council has again to acknowledge very gratefully the aid of the Horticultural Press in giving wide publicity to its work at Wisley ; to the members of the Garden Committee and the Judging Committees who have given many days and much experience to the carrying out of that work ; and to the members of the Wisley Staff upon whom the execution of the work falls and who spare themselves nothing in carrying it out.

27. Conclusion.—Wide as is the work done at Wisley for horticulture, the Council feels it could be usefully extended if it had means which could be definitely earmarked for the purpose. The provision of a hostel for students, the prosecution of particular pieces of investigational work, are all urgent measures which Fellows of the Society might wish to endow ; and as all of them would be likely to be of lasting benefit to horticulture they should appeal strongly to Fellows of the Society.

Signed on behalf of the Council,
LAMBOURNE,
President.

December 12, 1922.

SCHEDULE OF INVESTMENTS.

31st December 1922.

			<i>£ s. d.</i>
5 % War Loan (1929-1947) £9,550	.	.	cost 9,274 18 2
3½ % War Loan (1925-1928) £4,998 16s. od.	.	.	,, 4,363 16 9
3½ % Conversion Loan £6,399 12s. 4d.	.	.	,, 5,000 0 0
.3 % Local Loans £5,800	.	.	,, 6,006 16 6
2½ % India Stock £186 9s. od.	.	.	,, 109 2 2
3½ % Dominion of Canada Registered Stock (1930-1950) £2,000	.	.	,, 2,000 0 0
5 % London County Stock (1940-1960) £2,114 0s. 9d.	.	.	,, 1,781 3 2
2½ % Metropolitan Consolidated Stock (1919-1940) £3,462 8s. 10d.	.	.	,, 1,783 6 7
2½ % Plymouth Corporation Red. Stock (1918-1958) £786 1s. 10d.	.	.	,, 386 19 7
6 % Plymouth Corporation Red. Stock (1940-1950) £427 13s. 6d.	.	.	,, 405 5 3
2½ % Bristol Corporation Debenture Red. Stock (1957) £2,096 13s. 6d.	.	.	,, 974 7 9
4½ % Central Argentine Railway, Limited, Consolidated Preference Stock £2,800	.	.	,, 2,907 3 6
4 % Central Argentine Railway, Limited, Debenture Stock £600	.	.	,, 537 15 10
5 % Havana Terminal Railroad Company Mortgage Debenture Bonds £8,300	.	.	,, 8,946 0 0
4 % Mortgage on Freehold £1,000	.	.	,, 1,000 0 0
			<u>£45,476 15 3</u>

[See also pp. xi, xv, xvii, xix.]

Dr.

ANNUAL REVENUE & EXPENDITURE ACCOUNT

		£ s. d.	£ s. d.
To ESTABLISHMENT CHARGES—			
Ground Rent		690 0 0	
Rates and Taxes		1,132 15 2	
Water Rate		85 19 0	
Electric Light		309 0 0	
Gas		124 19 11	
			<u>2,342 14 1</u>
Salaries and Wages		3,980 15 2	
Annuities		926 0 0	
Printing and Stationery		1,438 0 7	
Publications		455 10 0	
Botanical Magazine		135 15 1	
Postages		780 1 10	
Fuel		103 15 6	
Professional Fees		295 8 4	
Gratuities		62 10 0	
Repairs and Renewals		162 1 0	
Miscellaneous Expenses		206 13 9	
			<u>8,546 11 3</u>
,, SCHOLARSHIPS			50 0 0
,, INSURANCES			132 17 8
,, JOURNAL, PRINTING AND POSTAGE			576 13 2
,, STAFF PENSION		331 3 8	
Less contributed by the Staff, as per scheme		174 15 0	
			<u>156 8 8</u>
,, MEETINGS—			
Spring Meeting		3,381 11 10	
Autumn Meeting		2,170 12 0	
Labour, Floral Meetings and Conferences		103 0 4	
Expenses, do. do.		33 2 0	
Council, Committee and Deputation Expenses		536 5 1	
Painting Orchid Certificates		41 9 6	
			<u>6,266 0 9</u>
,, INSPECTION OF GARDENS			310 15 7
,, PRIZES AND MEDALS—			
Awarded at Society's Meetings			526 16 7
,, CONTRIBUTION TO LINDLEY LIBRARY—			
Purchase of Books		251 12 5	
Expenses		200 9 6	
			<u>452 1 11</u>
,, SPECIAL EXPENDITURE —			
Pritzel Revision		775 16 2	
Sundries		431 8 6	
			<u>1,207 4 8</u>
,, DEPRECIATION—			
Hall Glass Roof, Furniture, and Appliances for Meetings, &c.			399 16 6
,, EXAMINATIONS IN HORTICULTURE—			
Expenses		233 0 8	
Less Received in Fees		210 0 0	
			<u>23 0 8</u>
,, BALANCE carried forward			20,926 13 0
			<u>£41,917 14 6</u>
,, CAPITAL EXPENDITURE, WISLEY			2,412 13 4
,, EXCESS OF EXPENDITURE OVER REVENUE, WISLEY			8,083 14 4
,, GENERAL RESERVE FUND			15,000 0 0
,, WEATHER INSURANCE FUND FOR CHELSEA AND OTHER MEETINGS			393 14 0
,, BALANCE, as per BALANCE SHEET			4,783 15 8
			<u>£30,673 17 4</u>

FOR YEAR ENDED 31st DECEMBER 1922.

Cr.

£41,917 14 6

,, Balance brought forward 20,926 13 0
 ,, Army Service Dept. for occupation of Hall 9,747 4 4

£30,673 17 4

Dr.

VINCENT SQUARE—BALANCE

LIABILITIES.

	£	s.	d.	£	s.	d.
TO CAPITAL FUNDS ACCOUNT—				48,279	12	2
Less Fees paid by Fellows now deceased				225	15	0
						48,053 17 2
„ LIFE COMPOSITIONS, 1922						817 19 0
„ SUNDRY CREDITORS						1,274 15 11
„ SUBSCRIPTIONS, &c., paid in advance						822 3 0
„ GENERAL RESERVE FUND						15,000 0 0
„ DEPRECIATION AND RENEWALS FUND—						
Balance, 31st December 1921				5,706	4	7
Added 1922				399	16	6
						6,106 1 1
„ WEATHER INSURANCE FUND for Chelsea and other Meetings						942 4 9
„ LABORATORY PRIZE FUND—						
Balance 31st December 1921				27	9	5
Dividends (Nicholson Memorial Fund)				1	3	1
						28 12 6
Less transferred to Nicholson Memorial Fund for Investment				20	1	5
						8 11 1
„ WILLIAMS MEMORIAL FUND				69	16	4
„ MASTERS MEMORIAL FUND				127	19	5
„ SCHRÖDER PENSION				6	6	8
„ LINDLEY LIBRARY TRUST				10	0	0
„ SIR JAMES KNOTT TRUST				30	0	0
„ MRS. EDWARD HARDING CUP FUND				59	17	5
„ VEITCH MEMORIAL FUND				252	1	9
						556 1 7
„ GENERAL REVENUE ACCOUNT				50,509	10	1
„ REVENUE FOR THE YEAR 1922, as per annexed Account				4,783	15	8
						55,293 5 9

£128,874 19 4

	ASSETS.			
	£	s.	d.	
By CAPITAL EXPENDITURE—				
,, NEW HALL AND OFFICES—				
As at 31st December 1921 . . .	41,277	13	4	
,, FURNISHING HALL AND OFFICES—				
As at 31st December 1921 . . .	2,577	0	5	
Add Purchases . . .	69	7	9	
	2,646	8	2	
,, FREEHOLD PROPERTY, WISLEY	8,268	16	6	
	52,192	18	0	
,, APPLIANCES FOR MEETINGS . . .	366	14	3	
,, SUNDY DEBTORS AND PAYMENTS MADE IN ADVANCE . . .	2,232	5	10	
,, WOKING WATER Co.—				
Deposit in respect of laying water-mains from Ripley to Wisley Gardens . . .	1,260	0	0	
,, EDUCATION CHARTS, Johnson, Riddle & Co. . .	242	15	0	
,, BOTANICAL MAGAZINE (Stock purchased) . . .	900	0	0	
Less Receipts . . .	197	12	6	
	702	7	6	
,, INVESTMENT of DEPRECIATION and RENEWALS FUND—				
3½% War Loan 1925-28, £305 5s. 1d. . . cost	266	16	6	
5% War Loan 1929-47, £3,970 0s. 1d. . . , "	3,898	4	11	
5% London County Stock 1940-60, £10 14s. 0d.	"	514	12	10
2½% Metropolitan Consolidated Stock 1919-40, £1,000 2s. cd. . .	"	515	5	2
2½% Plymouth Corporation Redeemable Stock 1918-58, £225 0s. 4d. . .	"	111	6	5
6% Plymouth Corporation Redeemable Stock 1940-50, £123 15s. 6d. . .	"	117	5	3
2½% Bristol Corporation Debenture Redeemable Stock 1957, £607 12s. cd. . .	"	282	13	6
	5,706	4	7	
Cash for Investment . . .	399	16	0	
	6,106	1	1	
,, INSURANCE FUND INVESTMENT ACCOUNT—				
5% War Loan 1929-47, £998 5s. 0d. . .	942	4	9	
,, INVESTMENTS, as per Schedule . . .	45,476	15	3	
,, GENERAL RESERVE FUND INVESTMENT ACCOUNT—				
5% War Loan, £10,000 0s. od. . .	9,950	10	0	
Conversion Loan, £6,540 17s. 5d. . .	5,000	0	0	
	14,950	10	0	
Add Cash for Investment . . .	49	10	0	
	15,000	0	0	
,, CASH—				
At Bank . . .	5,062	6	2	
Less Wisley Depreciation Fund £260 2 0				
Vincent Square Fund . . .	399	16	6	
General Reserve Fund . . .	49	10	0	
	709	8	6	
	4,352	17	8	
	£128,874	19	4	

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position of the Society on 31st December 1922. In the above total of Assets £128,874 19s. 4d. are included investments amounting to a total sum of £6,106 1s. 1d. representing depreciation reserves, on account of such matters as roof renewal, hall painting, &c., and these funds are not available for the General Purposes of the Society.

ALFRED C. HARPER, F.C.A., Auditor
(HARPER BROS. & FEATHER, Chartered Accountants),
35 GREAT TOWER STREET, LONDON, E.C.

Dr. WISLEY GARDENS—ANNUAL REVENUE & EXPENDITURE

	£ s. d.	£ s. d.
To SALARIES—		
Wisley Gardens and Research Station	3,245 4 8	
„ RATES AND TAXES	160 11 0	
„ WATER RATE	54 9 7	
„ INSURANCES	34 17 7	
„ LABOUR	3,198 12 4	
„ GARDEN IMPLEMENTS	62 11 2	
„ LOAM AND MANURE	103 18 11	
„ REPAIRS	351 8 11	
„ FUEL	761 3 8	
	<u>4,727 13 2</u>	
„ MISCELLANEOUS EXPENSES—		
Garden	920 10 1	
Laboratory	205 3 6	
	<u>1,125 13 7</u>	
„ STAFF PENSION		
Less contributed by Staff, as per scheme	<u>311 11 0</u>	
	<u>176 15 8</u>	
	<u>134 15 4</u>	
„ DEPRECIATION—		
Glass Houses, Plant and Materials	371 10 0	
Motor	303 10 0	
	<u>675 0 0</u>	
„ SPECIAL EXPENDITURE		
	<u>246 7 2</u>	
	<u>£10,154 13 11</u>	

ACCOUNT FOR YEAR ENDED 31st DECEMBER 1922.

Cr.

	£	s.	d.
By DIVIDENDS AND INTEREST	1,326	10	1
,, PRODUCE SOLD	53	8	4
,, ANALYSIS FEES	20	16	2
,, STUDENTS' FEES	68	5	0
,, DONATIONS	25	0	0
,, CONTRIBUTION BY MINISTRY OF AGRICULTURE	100	0	0
,, BALANCE to General Revenue and Expenditure Account	8,083	14	4

£10,154 13 11

Dr.

WISLEY GARDENS—BALANCE

LIABILITIES.

	£ s. d.	£ s. d.
To CAPITAL FUNDS ACCOUNT—		
As at 31st December 1921	32,586 17 4	
Add Amount contributed by R.H. Society, 31st December 1922	2,412 13 4	
	<u>34,999 10 8</u>	
„ ENDOWMENT TRUST FUND		28,972 7 11
„ DEPRECIATION AND RENEWALS RESERVE FUND—		
As at 31st December 1921	4,841 17 3	
Added, 1922	130 1 0	
	<u>4,971 18 3</u>	

£68,943 16 10

ASSETS.

By DWELLING HOUSES—		<i>f</i>	<i>s.</i>	<i>d.</i>	<i>f</i>	<i>s.</i>	<i>d.</i>
As at 31st December 1921		5,651	17	4			
,, GLASS HOUSES, RANGES, POTTING SHEDS, &c.—							
As at 31st December 1921		5,202	6	0			
,, LABORATORY—							
As at 31st December 1921		20,623	18	2			
					31,478	1	6
N.B.—The Hanbury Trust Estate is, under the Trust Deed, vested in the Society only so long as it is in the position to use it as an Experimental Garden. The value of the expenditure thereon depends therefore on the continual use of the Garden by the Society.							
,, STOCK FUEL					120	0	0
,, MOTOR CAR AND LORRY					1,112	13	0
Less Depreciation					303	10	0
					809	3	0
,, INVENTORY OF PLANT AND LOOSE EFFECTS (as taken by Mr. Chittenden)—							
Gardens					1,720	15	6
Farm					972	14	4
					2,693	9	10
,, LIBRARY					277	9	0
,, INVESTMENT OF DEPRECIATION AND RENEWALS RESERVE ACCOUNT—							
5 % War Loan, 1929-7 . £2,481 8 9 cost		2,377	5	11			
3½ % War Loan, 1925-28 . £395 18 11 ,,		346	9	0			
5% L'ndon Cnty. Stk. 1940-50 £785 5 3 ,,		661	13	6			
2½ % Met. Cons. Stk. 1919-40 £1,287 9 2 ,,		662	19	3			
2½ % Plymouth Cor. Red.							
Stock 1918-58 . £288 8 10 ,,		142	1	0			
6 % Plymouth Cor. Red.							
Stock 1940-50 . £159 18 4 ,,		151	12	4			
2½ % Bristol Cor. Red. Stk.							
1957 . £795 14 6 ,,		369	15	3			
					4,711	16	3
Add Cash for Investment					260	2	0
					4,971	18	3

,, ENDOWMENT TRUST FUND INVESTMENTS—

Gt. Eastern Rly. 4 % Deb. Stk. £3,500 cost 3,535 0 0

Leopoldina Rly. 5 % Term. Debs. £2,000 ,, 2,000 0 0

City of Moscow Loan, 1912, 4½ % Bonds £6,000 ,, 5,730 0 0

Buenos Ayres Gt. S. Rly. 5% Non-Cum. Pf. Stk. £2,500 .. 2,825 0 0

5 % War Stock, 1929-47 £9,350 .. 8,972 7 11

Can.Pac.Ry.4%Per.Cons.Deb.Stk. £4,632 .. 3,890 17 6

London County Cons. 3½ % Stk. £135/8/4 .. 130 0 0

5 % London County Stk., 1940-60 £600 .. 505 12 0

2½ % Met. Cons. Stk., 1919-40 £970 .. 499 12 0

2½ % Ply. Cor. Red. Stk., 1918-58 £400 .. 197 1 0

6 % Ply. Cor. Red. Stk., 1940-50. £30/9/4 .. 29 6 4

2½ % Bristol Cor. Red. Stk., 1957 £600 .. 278 18 6

28,593 15 3

(In common with most pre-war Securities, the above have, for sale purposes, depreciated, but for revenue purposes they bring in the same income as before, less Interest on the City of Moscow Loan, upon which no dividend has been received during the year.) £68,943 16 10

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position on the 31st December 1922.

ALFRED C. HARPER, F.C.A., Auditor
(HARPER BROS. & FEATHER, Chartered Accountants),
35 Great Tower Street, London, E.C.

9th January 1923.

Dr.

ALFRED DAVIS

Bequeathed to the Society in 1870 for Annual Prizes

To Amount of Fund, 31st December 1921	£	s.	d.	£	s.	d.
	946	0	3			

.. Dividends received 1922	946	0	3	54	2	9
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WILLIAMS

Raised by Donations in 1891 in Memory of

To Amount of Fund, 31st December 1921	£	s.	d.	£	s.	d.
	204	2	5			

.. Balance 31st December 1921	204	2	5	62	9	10
.. Dividends received 1922				7	6	6
				69	16	4

MASTERS

Raised by Donations in 1908 in Memory of Dr. Masters

To Amount of Fund, 31st December 1921	£	s.	d.	£	s.	d.
	542	17	0			

.. Balance 31st December 1921	542	17	0	127	19	5
.. Dividends received 1922				20	0	0
				147	19	5

NICHOLSON

Raised by Donations in 1908 in Memory of

To Amount of Fund, 31st December 1921	£	s.	d.	£	s.	d.
Add Purchase of Local Loans £31 11s. od. at 3% from Wisley Laboratory Prize Fund	160	12	11			
	20	1	5			
	180	14	4			

.. Dividends received 1922	7	4	1
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SCHRÖDER

Provided by the Royal Horticultural Society in Memory of the late Baron

To Amount of Fund, 31st December 1921	£	s.	d.	£	s.	d.
	557	14	6			
.. Balance 31st December 1921	6	6	8			
.. Dividends received 1922	20	0	0			
	26	6	8			

TRUST FUND.

Cr.

or in any other way the Council may determine.

	£ s. d.	£ s. d.
By London County 5 % Stock, 1940-60, £375 . . .	316 0 0	
,, Met. Consd. 2½ % do. 1919-40, £610 . . .	314 4 0	
,, Plymouth Corp. 2½ % Red. Stk., 1918-58, £200 . . .	98 10 6	
,, do. 6 % do. 1940-50, £32 7 4	31 2 3	
,, Bristol Corp. 2½ % do. 1957, £400 . . .	186 3 0	
	<u>946 0 3</u>	<u>54 2 9</u>
,, Revenue and Expenditure Account . . .		

MEMORIAL FUND.

B. S. Williams towards Prizes and Medals.

	£ s. d.	£ s. d.
By East India Railway Co. Annuity, Class B £7 . . .	168 0 0	
,, New South Wales Government 4 per cent. Inscribed Stock (1942-62) £36 3s. 1d. . . .	36 2 5	
	<u>204 2 5</u>	<u>69 16 4</u>
,, Balance in hands of R.H. Society . . .		
	<u>69 16 4</u>	

MEMORIAL FUND.

towards the Provision of one or more Annual Lectures.

	£ s. d.	£ s. d.
By Midland Railway Consolidated 2½ per cent. Perpetual Preference Stock £400	290 13 6	
,, Midland Railway Consolidated 2½ per cent. Perpetual Guaranteed Preference Stock £400	252 3 6	
	<u>542 17 0</u>	<u>20 0 0</u>
,, Lectures given		
,, Balance in hands of R.H. Society		
	<u>127 19 5</u>	<u>147 19 5</u>

MEMORIAL FUND.

George Nicholson for Prizes to Wisley Students.

	£ s. d.	£ s. d.
By Local Loans 3 %, £31 11s. od. . . .	20 1 5	
,, Tasmanian Government 4 per cent. Inscribed Stock (1940-50) £162 4s. 5d. . . .	160 12 11	
	<u>180 14 4</u>	<u>6 1 0</u>
,, Prizes		
,, Wisley Laboratory Prize Fund		
	<u>1 3 1</u>	<u>7 4 1</u>

PENSION.

Schröder to pay to Gardeners' Royal Benevolent Institution for one Pension.

	£ s. d.	£ s. d.
By Great Western Railway 4 per cent. Debenture Stock £500	557 14 6	
,, Gardeners' Royal Benevolent Institution	20 0 0	
,, Balance in hands of R.H. Society	6 6 8	
	<u>26 6 8</u>	

Dr.

LINDLEY LIBRARY

	£ s. d.	£ s. d.
To Amount of Fund, 31st December 1921.	6,743 7 5	
,, Contribution from R.H. Society, 31st December 1922	251 12 5	
	<hr/> <u>6,994 19 10</u>	
To Balance 31st December 1921	10 0 0	
,, Dividends and Donations received 1922	46 10 6	
,, Contribution from R.H. Society, 31st December 1922	200 9 6	
	<hr/> <u>257 0 0</u>	

PRITZEL REVISION

Fund to be raised for the Revision of

	£ s. d.	£ s. d.
To Amount of Fund, 31st December 1921.	<u>859 2 2</u>	
,, Dividends received, 1922	34 3 10	
	<hr/> <u>34 3 10</u>	

SIR JAMES KNOTT

Bequeathed to the Society in 1920 for the purpose

	£ s. d.	£ s. d.
To Amount of Fund, 31st December 1921	<u>600 0 0</u>	
,, Balance, 31st December 1921	26 0 0	
,, Dividends received, 1922	30 0 0	
	<hr/> <u>56 0 0</u>	

VEITCH MEMORIAL

For the Encouragement

	£ s. d.	£ s. d.
To Amount of Fund	<u>1,673 19 1</u>	
Transferred to R.H. Society, January 1922		
	<hr/> <u>1,673 19 1</u>	
,, Balance transferred to R.H. Society January 1922	255 18 7	
,, Dividends and Interest received 1922	96 3 2	
	<hr/> <u>352 1 9</u>	

TRUST.**Cr.**

	<i>£ s. d.</i>	<i>£ s. d.</i>
By London & North Western Railway 4 per cent.		
Preference Stock, £1,137	1,458 15 7	
,, Value of Library, 31st December 1921	5,284 11 10	
,, Purchase of Books, 1922	251 12 5	
	<u>6,994 19 10</u>	
By Librarian's Salary		247 0 0
,, Balance in hands of R.H. Society		10 0 0
		<u>257 0 0</u>

FUND.

Pritzel's Iconum-Botanicarum Index.

	<i>£ s. d.</i>	<i>£ s. d.</i>
By India 2½ per cent. Stock £1,367 13s. 6d.	<u>859 2 2</u>	
,, Loan, R.H. Society, repaid		34 3 10
		<u>34 3 10</u>

TRUST.

of providing a Scholarship for Wisley Students.

	<i>£ s. d.</i>	<i>£ s. d.</i>
By War Stock 5% 1929-47	<u>600 0 0</u>	
,, Cash expended, 1922		26 0 0
,, Balance in hands of R.H. Society		30 0 0
		<u>56 0 0</u>

TRUST FUND.

of Horticulture.

	<i>£ s. d.</i>	<i>£ s. d.</i>
By Victorian Government 6½% Ins. Stock	1,354 0 1	
,, War Stock 5% 1929-47	319 19 0	
	<u>1,673 19 1</u>	
,, Amount distributed		100 0 0
,, Balance in hands of R.H. Society		252 1 9
		<u>352 1 9</u>

GENERAL MEETING.

FEBRUARY 27, 1923.

Lt.-Col. MESSEL in the Chair.

One hundred and forty-nine Fellows and three Associates were elected, and three Societies affiliated.

A lecture was given by Miss E. Sinclair Rohde on "The Earliest Records of Plant Lore in the English Language."

GENERAL MEETING.

MARCH 13, 1923.

The Rt. Hon. The Lord LAMBOURNE in the Chair.

One hundred and seventeen Fellows and eight Associates were elected, and five Societies affiliated.

GENERAL MEETING.

MARCH 27, 1923.

W. R. DYKES, Esq., M.A., in the Chair.

One hundred and nineteen Fellows and three Associates were elected, and three Societies affiliated.

The Masters Memorial Lecture was given by Dr. Rendle, F.R.S., on "Plants and their Environment."

GENERAL MEETING.

APRIL 10, 1923.

The Rt. Hon. The Lord LAMBOURNE in the Chair.

One hundred and seventeen Fellows and one Associate were elected, and three Societies affiliated.

DAFFODIL SHOW.

THURSDAY and FRIDAY, APRIL 12 and 13, 1923.

Section I. OPEN CLASSES.

(Exhibitors in Section I. were not permitted to enter or compete in Sections V. and VI.)

The prizes in Classes 1 to 5 inclusive were :

First Prize, Silver Flora Medal and £1; Second, £1; Third, 10s.

Class 1.—Twelve varieties (Division I.). Three stems of each.

1st. Richardson, Mr. J. L., Prospect House, Waterford.

2nd. Lower, Dr. N. Y., St. Davids, Presteign, Radnor.

3rd. Welsh Bulb Fields, St. Asaph, N. Wales.

Class 2.—Twelve varieties (Division II.). Three stems of each.

1st. Welsh Bulb Fields.

2nd. Richardson, Mr. J. L.

3rd. Donald Nursery Co., Newcastle, Co. Down.

Class 3.—Twelve varieties (Division III.). Three stems of each.

Equal Firsts, Chapman, Mr. F. H.; Richardson, Mr. J. L.

2nd. Welsh Bulb Fields.

Class 4.—Twelve varieties (Division IVb.). Three stems of each.

No awards.

Class 5.—Twelve varieties (Division IX.). Three stems of each.

1st. Chapman, Mr. F. H.

Class 6.—Nine varieties (Division IVa.). Three stems of each.

First Prize, Silver Banksian Medal and £1; Second, £1; Third, 10s.

3rd. Donard Nursery Co.

The prizes in Classes 7 to 19 inclusive were :

First Prize, Silver Banksian Medal and £1; Second, 15s.; Third, 10s.

Class 7.—Six varieties (Division Ia.). Three stems of each.

1st. Cranfield, Mr. W. B., East Lodge, Enfield Chase, Middlesex.

2nd. Chapman, Mr. F. H.

3rd. Buncombe, Rev. T., The Rectory, Black Torrington, Devon.

Class 8.—Six varieties (Division Ib.). Three stems of each.

1st. Richardson, Mr. J. L.

2nd. Cranfield, Mr. W. B.

3rd. Buncombe, Rev. T.

Class 9.—Six varieties (Division Ic.). Three stems of each.

1st. Buncombe, Rev. T.

2nd. Cranfield, Mr. W. B.

3rd. Donard Nursery Co.

Class 10.—Six varieties (Division IIa.). Three stems of each.

1st. Lower, Dr. N. Y.

2nd. Richardson, Mr. J. L.

3rd. Cranfield, Mr. W. B.

Class 11.—Six varieties (Division IIb.). Three stems of each.

1st. Lower, Dr. N. Y.

2nd. Richardson, Mr. J. L.

3rd. Buncombe, Rev. T.

Class 12.—Six varieties (Division IIIa.). Three stems of each.

2nd. Buncombe, Rev. T.

Class 13.—Six varieties (Division IIIb.). Three stems of each.

1st. Lower, Dr. N. Y.

2nd. Buncombe, Rev. T.

3rd. Richardson, Mr. J. L.

Class 14.—Six varieties (Division IVa.). Three stems of each.

1st. Richardson, Mr. J. L.

2nd. Cranfield, Mr. W. B.

Class 15.—Six varieties (Division IVb.). Three stems of each.

1st. Chapman, Mr. F. H.

2nd. Buncombe, Rev. T.

Class 16.—Six varieties (Division V.). Three stems of each.

1st. Cranfield, Mr. W. B.

2nd. Copeland, Mr. W. F. M., West View, Shirley, Southampton.

Class 17.—Six varieties (Divisions VI. and VII.). Three stems of each.

No awards.

Class 18.—Six varieties (Division VIII.). Three stems of each.

No awards.

Class 19.—Six varieties (Division X.). Three stems of each.

1st. Copeland, Mr. W. F. M.

Section II. NEW VARIETIES—OPEN CLASSES.

(Exhibitors were not permitted to enter or compete in more than one of the Classes 20, 21 and 22.)

Class 20.—Twelve varieties, not in commerce. One stem of each.

First Prize, Engleheart Challenge Cup and £1; Second, Silver-gilt Flora Medal and £1; Third, Silver Flora Medal and 15s.

1st. Lower, Dr. N. Y.

2nd. Welsh Bulb Fields.

3rd. Welchman, Mr. W., Birdbeck House, Upwell, Wisbech.

xxii PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY

Class 21.—Six varieties, not in commerce. One stem of each.

First Prize, Silver Flora Medal and £1; Second, Silver Banksian Medal and 15s.; Third, Bronze Banksian Medal and 10s.

1st. Richardson, Mr. J. L.

2nd. Mitchell, Mr. W. F., The Lodge, Leek Wootton, Warwick.

3rd. Mallender, Mr. J., Scrooby, Bawtry, Yorks.

Extra. Hawker, Capt. H. G., Strode, Ermington, Devon.

Class 22.—Three varieties, not in commerce. One stem of each.

First Prize, Silver Banksian Medal and 10s.; Second, Bronze Flora Medal and 7s. 6d.; Third, 7s. 6d.

1st. Copeland, Mr. W. F. M.

2nd. Buncombe, Rev. T.

3rd. Vokes, Mr. F. M., Birchlawn, Sholing, Southampton.

(Exhibitors were not permitted to enter or compete in more than one of the Classes 23, 24 and 25.)

Class 23.—Twelve varieties, raised by the exhibitor. One stem of each.

First Prize, Gold Medal; Second, Silver-gilt Flora Medal; Third, Silver Flora Medal.

1st. Lower, Dr. N. Y.

2nd. Chapman, Mr. F. H.

3rd. Richardson, Mr. J. L.

Class 24.—Six varieties, raised by the exhibitor. One stem of each.

First Prize, Silver Flora Medal; Second, Silver Banksian Medal; Third, Bronze Banksian Medal.

1st. Williams, Mr. P. D., Lanarth, St. Keverne, Cornwall.

2nd. Cranfield, Mr. W. B.

3rd. Thurston, Mr. E. H., Fryern, Chandlers Ford, Hants.

Class 25.—Three varieties, raised by the exhibitor. One stem of each.

First Prize, Silver Banksian Medal; Second, Bronze Flora Medal; Third, Bronze Banksian Medal.

1st. Cave, Sir C. H., Bt., Sidbury Manor, Sidmouth.

2nd. Barchard, Mr. F., Horsted Place, Uckfield.

3rd. Copeland, Mr. W. F. M.

Class 26.—Novice Class.—Three varieties, not in commerce, distinct. Three stems of each. This class was open only to exhibitors who had never previously won a first prize for seedling Daffodils.

First Prize, Silver Banksian Medal; Second, Bronze Flora Medal; Third, Bronze Banksian Medal.

1st. Hinchliffe, Miss K. M., Worlington House, Instow, N. Devon.

2nd. Vokes, Mr. F. M.

3rd. Shea, Mr. C. E., The Elms, Foots Cray, Kent.

Section III. MARKET CLASSES.

Class 27.—Six varieties, twelve stems of each, as packed for market and judged from the market standpoint.

First Prize, Silver Flora Medal and £1; Second, 15s.; Third, 10s.

1st. Poupart, Mr. J., The Brooks, Barnham Junction, Sussex.

2nd. Downes, Mr. W. P., Waterway, Upwell, Wisbech.

Class 28.—A market box of Daffodils as packed for market.

First Prize, Silver-gilt Banksian Medal and 30s.; Second, 20s.; Third, 15s.

1st. Poupart, Mr. J.

2nd. Exley, Mr. J. E., Wood Lane, Calverley, Leeds.

3rd. Welsh Bulb Fields.

Section IV. SINGLE BLOOMS—OPEN CLASSES.

The prizes in the following classes 29 to 44 inclusive were:
First Prize, 7s. 6d.; Second, 5s.; Third, 2s. 6d.

Class 29.—One bloom. Ia.

- 1st. Mitchell, Mr. W. F.
- 2nd. Hawker, Capt. H. G.
- 3rd. Cranfield, Mr. W. B.
- Extra. Richardson, Mr. J. L.

Class 30.—One bloom. Ib.

- 1st. Richardson, Mr. J. L.
- 2nd. Batson, Mr. T., Beaworthy, N. Devon.
- 3rd. Cranfield, Mr. W. B.
- Extra. Lower, Dr. N. Y.

Class 31.—One bloom. Ic.

- 1st. Williams, Mr. P. D.
- 2nd. Richardson, Mr. J. L.
- 3rd. Cranfield, Mr. W. B.
- Extra. Welchman, Mr. W.

Class 32.—One bloom. IIa.

- 1st. Richardson, Mr. J. L.
- 2nd. Williams, Mr. P. D.
- 3rd. Cranfield, Mr. W. B.
- Extra. Welchman, Mr. W.

Class 33.—One bloom. IIb.

- 1st. Williams, Mr. P. D.
- 2nd. Mallender, Mr. J.
- 3rd. Barchard, Mr. F.
- Extra. Welsh Bulb Fields.

Class 34.—One bloom. IIIa.

- 1st. Williams, Mr. P. D.
- 2nd. Welsh Bulb Fields.
- 3rd. Welchman, Mr. W.
- Extra. Copeland, Mr. W. F. M.

Class 35.—One bloom. IIIb.

- 1st. Richardson, Mr. J. L.
- 2nd. Cranfield, Mr. W. B.
- 3rd. Williams, Mr. P. D.
- Extra. Lower, Dr. N. Y.

Class 36.—One bloom. IVa.

- 1st. Williams, Mr. P. D.
- 2nd. Lower, Dr. N. Y.
- 3rd. Cranfield, Mr. W. B.
- Extra. Richardson, Mr. J. L.

Class 37.—One bloom. IVb.

- 1st. Williams, Mr. P. D.
- 2nd. Richardson, Mr. J. L.
- 3rd. Cranfield, Mr. W. B.

Class 38.—One stem. V. Trumpet-shaped.

- 2nd. Richardson, Mr. J. L.
- 3rd. Donard Nursery Co.

Class 39.—One stem. V. Cup-shaped.

- 1st. Cranfield, Mr. W. B.
- 2nd. Lower, Dr. N. Y.
- 3rd. Copeland, Mr. W. F. M.

Class 40.—One stem. VI.

- 2nd. Copeland, Mr. W. F. M.

Class 41.—One stem. VII.

- 1st. Cranfield, Mr. W. B.
- 2nd. Williams, Mr. P. D.
- 3rd. Donard Nursery Co.
- Extra. Richardson, Mr. J. L.

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Class 42.—One stem. VIII.

- 1st. Welsh Bulb Fields.
- 2nd. Williams, Mr. P. D.
- 3rd. Lower, Dr. N. Y.

Class 43.—One bloom. IX.

- 1st. Hawker, Capt. H. G.
- 2nd. Barchard, Mr. F.
- 3rd. Chapman, Mr. F. H.

Extra. Richardson, Mr. J. L.

Class 44.—One bloom. X.

- 1st. Welsh Bulb Fields.
- 2nd. Mitchell, Mr. W. F.
- 3rd. Copeland, Mr. W. F. M.

Section V. AMATEURS ONLY.

(Exhibitors in Section V. were not permitted to enter or compete in
Sections I. or VI.)
(Only flowers in commerce permitted.)

Class 45.—Collection of 24 varieties, fairly representing the different Divisions.
Three stems of each.

*First Prize, Silver Flora Medal and £1; Second, Silver Banksian Medal
and 15s.; Third, Bronze Flora Medal and 10s.*

- 1st. Darlington, Mr. H. R., Park House, Potters Bar.
- 2nd. Hinchliffe, Miss K. M.

The prizes in the following classes, 46 to 53 inclusive, were as follow :

First Prize, 15s.; Second, 10s.; Third, 7s. 6d.

Class 46.—Six varieties (Division I.). Three stems of each.

- 1st. Darlington, Mr. H. R.

Class 47.—Six varieties (Division II.). Three stems of each.

- 1st. Darlington, Mr. H. R.

Class 48.—Six varieties (Division III.). Three stems of each.

- 3rd. Darlington, Mr. H. R.

Class 49.—Six varieties (Division IVa.). Three stems of each.

- 2nd. Darlington, Mr. H. R.

Class 50.—Six varieties (Division IVb.). Three stems of each.

- 2nd. Darlington, Mr. H. R.

Class 51.—Six varieties (Division V.). One stem of each.

- 2nd. Darlington, Mr. H. R.

Class 52.—Six varieties (Division VIII.). Three stems of each.

- 1st. Darlington, Mr. H. R.

Class 53.—Six varieties (Division IX.). Three stems of each.

- 2nd. Darlington, Mr. H. R.

Class 54.—Three varieties (Division X.). Three stems of each.

First Prize, 7s. 6d.; Second, 5s.; Third, 3s.

- 1st. Darlington, Mr. H. R.

Section VI. AMATEURS ONLY.

(Only flowers in commerce permitted.)
(Exhibitors in Section VI. were not permitted to enter or compete in
Sections I. or V.).

Class 55.—Twelve varieties, representing not less than six of the different
Divisions. Three stems of each.

*First Prize, Silver Flora Medal and 10s. 6d.; Second, Silver Banksian
Medal and 7s. 6d.; Third, Bronze Flora Medal and 5s.*

- 1st. Churcher, Maj. Geo., Woodcole, Alverstoke.
- 2nd. Robinson, Mr. B., The Beeches, Hindleby, Spilsby.
- 3rd. Warren, Miss V., The Oaks, Westbere, Canterbury.

The prizes in the following Classes, 50 to 69 inclusive, were :

First Prize, 7s. 6d.; Second, 5s.; Third, 3s.

Class 56.—Three varieties (Division Ia.). Three stems of each.

1st. Robinson, Mr. B.

2nd. Vokes, Mr. F. M.

3rd. Johnson, Mr. A., Greenstede, West Hill, E. Grinstead.

Class 57.—Three varieties (Division Ib.). Three stems of each.

1st. Johnson, Mr. A.

2nd. Robinson, Mr. B.

Class 58.—Three varieties (Division Ic.). Three stems of each.

1st. Robinson, Mr. B.

Class 59.—Three varieties (Division IIa.). Three stems of each.

1st. Vokes, Mr. F. M.

2nd. Robinson, Mr. B.

Class 60.—Three varieties (Division IIb.). Three stems of each.

1st. Robinson, Mr. B.

2nd. Vokes, Mr. F. M.

3rd. Johnson, Mr. A.

Class 61.—Three varieties (Division IIIa.). Three stems of each.

No awards.

Class 62.—Three varieties (Division IIIb.). Three stems of each.

1st. Vokes, Mr. F. M.

2nd. Robinson, Mr. B.

3rd. Johnson, Mr. A.

Class 63.—Three varieties (Division IVa.). Three stems of each.

1st. Robinson, Mr. B.

2nd. Johnson, Mr. A.

Class 64.—Three varieties (Division IVb.). Three stems of each.

1st. Robinson, Mr. B.

2nd. Johnson, Mr. A.

Class 65.—Three varieties (Division V.), with small crowns. One stem of each.

1st. Thurston, Mr. E. H.

Class 66.—Three varieties (Division V.), with large trumpets. One stem of each.

1st. Thurston, Mr. E. H.

2nd. Johnson, Mr. A.

Class 67.—Three varieties (Division VIII.). Three stems of each.

No awards.

Class 68.—Three varieties (Division IX.). Three stems of each.

1st Vokes, Mr. F. M.

2nd. Johnson, Mr. A.

Class 69.—Three varieties (Division X.). Three stems of each.

1st. Robinson, Mr. B.

Section VII. OPEN TO ALL AMATEURS.

Class 70.—A collection of thirty-six varieties, three stems of each, fairly representing Divisions I., II., III., IV., V., IX., and X. Divisions VI. and VII. optional, Divisions VIII. and XI. excluded.

First Prize, the Barr Silver Daffodil Vase, presented by Messrs. Barr & Sons; Second, £3; Third, £2.

The Barr Silver Daffodil Vase cannot be won by the same exhibitor two years in succession.

1st. Cranfield, Mr. W. B.

2nd. Arkwright, Mr. J. S., Kinsham Court, Presteign.

3rd. Lee, Mr. H., Inglewood, Bradmore, Wolverhampton.

XXVI PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

The Peter Barr Memorial Cup.

Awarded every year by the Council on the recommendation of the Narcissus Committee to one who, in the Committee's opinion, has done good work of some kind on Daffodils.

Awarded to Mr. C. H. Curtis, 2 Adelaide Road, Brentford.

GENERAL MEETING.

APRIL 24, 1923.

G. W. E. LODER, Esq., in the Chair.

One hundred and fifty-eight Fellows and two Associates were elected, and four Societies affiliated. A lecture was given by Mr. J. A. McPherson on "New Zealand Flora."

GENERAL MEETING.

MAY 8, 1923.

C. T. MUSGRAVE, Esq., in the Chair.

One hundred and fifty-nine Fellows and four Associates were elected, and five Societies affiliated.

CHELSEA SHOW.

MAY 29-31, 1923.

List of Awards.

CHALLENGE CUPS.

Sherwood Cup, for the most meritorious exhibit in the Show.

To Messrs. Charlesworth & Co., for Orchids.

"*Daily Graphic*" Cup, for the best Rock Garden.

To Mr. B. H. B. Symons-Jeune.

Cain Cup, for the best exhibit by an Amateur.

To Pantia Ralli, Esq., for Orchids.

SPECIAL CUP.

Allwood Carnation Bowl, for the best group of Carnations exhibited by an Amateur.

To Sir William Cain, Bt.

CARNATIONS.

Gold Medal.

To Messrs. Allwood Bros., for Carnations.

To Mr. C. Engelmann, for Carnations.

Large Silver Cup.

To Sir William Cain, Bt., for Carnations.

To Mr. James Douglas, for Border Carnations.

Silver-gilt Flora Medal.

To the Rt. Hon. Lord Lambourne, C.V.O., for Carnations.

Silver-gilt Banksian Medal.

To Messrs. Luxford & Co., for Carnations.

Silver Flora Medal.

To Mr. C. H. Herbert, for Pinks.

To Messrs. Stuart Low & Co., for Carnations.

Silver Banksian Medal.

To Mr. C. H. Taudevin, for Carnations.

Bronze Flora Medal.

To Messrs. A. Ireland & Hitchcock, for new Dianthus.

HERBACEOUS PLANTS, ETC.

Gold Medal.

To Messrs. G. Jackman & Son, for Clematis.

Large Silver Cup.

To Messrs. Barr & Sons, for bulbous and herbaceous plants.

Small Silver Cup.

To Mr. J. C. Allgrove, for herbaceous plants and shrubs.

To Messrs. Bees, Ltd., for alpine and herbaceous plants.

To Messrs. W. H. Rogers & Son, for alpine and herbaceous plants.

Silver-gilt Flora Medal.

To Mr. G. P. Downer, for Lupines.

To Maytham Gardens, for Lupines.

To Messrs. M. Prichard & Sons, for herbaceous and alpine plants.

To Messrs. Bakers, Ltd., for herbaceous and alpine plants.

To Messrs. Bowell & Skarratt, for herbaceous and alpine plants.

To Messrs. Maxwell & Beale, for herbaceous and alpine plants.

To Messrs. Reamsbottom & Co., for Anemones.

To Messrs. Storrie & Storrie, for Primulas, etc.

To Mr. F. G. Wood, for herbaceous and alpine plants.

To Mr. W. Wells, jun., for herbaceous plants.

To Mr. Jas. MacDonald, for grasses.

Silver-gilt Banksian Medal.

To Chalk Hill Nurseries, for hardy perennials, Mimulus, etc.

To Messrs. J. Cheal & Sons, Ltd., for rock and herbaceous plants and Dahlias.

To Messrs. G. & A. Clark, Ltd., for hardy flowers.

To Mr. G. Reuthe, for herbaceous plants, etc.

To Messrs. Waterer, Sons & Crisp, Ltd., for herbaceous plants.

To Messrs. W. Artindale & Sons, for herbaceous plants.

To Messrs. P. H. Bath, Ltd., for herbaceous plants.

To Messrs. K. & J. Hill, for alpine plants.

To Mr. G. W. Miller, for hardy plants.

To Mr. V. C. Vickers, for Aquilegias.

Silver Flora Medal.

To Messrs. B. Ladham's, Ltd., for herbaceous plants.

To Messrs. G. Gibson & Co., for herbaceous plants and new Lupines.

To Messrs. Rich & Co., for hardy herbaceous plants.

Silver Banksian Medal.

To Mr. F. Gifford, for Paeonies.

To Maytham Gardens, for herbaceous border.

ORCHIDS.

Gold Medal and Congratulations.

To Messrs. Charlesworth & Co., for Orchids.

Gold Medal.

To Pantia Ralli, Esq., for Orchids.

To Messrs. J. & A. McBean, for Orchids.

Large Silver Cup.

To Messrs. Sanders, for Orchids.

To Messrs. Stuart Low & Co., for Orchids.

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Small Silver Cup.

To Sir Jeremiah Colman, Bt. (gr. J. Collier), for Orchids.
To Messrs. Cowan & Co., for Orchids.
To Messrs. J. Cypher & Sons, for Orchids.

Silver-gilt Flora Medal.

To Messrs. Flory & Black, for Orchids.

Silver-gilt Banksian Medal.

To Messrs. Mansell & Hatcher, Ltd., for Orchids.

Silver Flora Medal.

To Mr. H. Dixon, for Orchids.

Silver Banksian Medal.

To H. T. Pitt, Esq., for Orchids.

FORMAL GARDENS.

Gold Medal.

To Messrs. J. Carter & Co., for water garden.
To Messrs. Kent & Brydon, for formal rock and water garden.

Large Silver Cup.

To Messrs. W. H. Gaze & Sons, Ltd., for formal garden.

Small Silver Cup.

To Messrs. J. Cheal & Sons, Ltd., for formal garden.

Silver-gilt Flora Medal.

To Orpington Nurseries Co., for formal paved rose garden.
To Messrs. W. Wood & Son, Ltd., for formal garden.

Silver-gilt Banksian Medal.

To Mr. Dixon, for formal garden.
To Messrs. En-Tout-Cas Co., for formal garden.
To Messrs. R. Neal & Son, for formal garden.

Silver Flora Medal.

To Messrs. Hodsons, Ltd., for formal garden.

Silver Banksian Medal.

To Messrs. J. Piper & Son, for formal garden.

SWEET PEAS.

Gold Medal.

To Messrs. Dobbie & Co., Ltd., for Sweet Peas.

Large Silver Cup.

To Messrs. Alex. Dickson & Sons, for Sweet Peas.

Small Silver Cup.

To Messrs. R. Bolton & Son, for Sweet Peas.

Silver-gilt Flora Medal.

To Messrs. Sutton & Sons, for Sweet Peas.

Silver-gilt Banksian Medal.

To Messrs. A. Ireland & Hitchcock, for Sweet Peas.

Silver Flora Medal.

To Mr. J. Stevenson, for Sweet Peas.

Bronze Flora Medal.

To Preston Hall Nurseries, for Sweet Peas.

FLOWERING TREES AND SHRUBS.

Gold Medal and Congratulations.

To Messrs. R. Wallace & Co., for Rhododendrons, etc.

Gold Medal.

To Messrs. R. & G. Cuthbert, for Azaleas.

To Mr. R. C. Notcutt, for flowering shrubs.

Silver-gilt Flora Medal.

To Messrs. Wm. Cutbush & Son, for clipped trees.

To Messrs. W. Fromow & Sons, for Maples (Japanese).

To Messrs. L. R. Russell, Ltd., for Azaleas and shrubs.

To Donard Nursery Co., for new and rare shrubs.

To Messrs. Hillier & Sons, Ltd., for choice flowering shrubs and trees.

To Messrs. M. Koster & Sons, for Rhododendrons and Azaleas.

To Mr. G. Reuthe, for rare shrubs.

Silver-gilt Banksian Medal.

To Messrs. Charlton & Sons, for trees and shrubs.

To Messrs. Waterer, Sons & Crisp, for shrubs and Rhododendrons.

Silver Banksian Medal.

To Messrs. Fletcher Bros., for Rhododendrons and conifers.

To Mr. J. Klinkert, for topiary trees.

To Yokohama Nursery Co., for Azaleas and dwarf shrubs.

To Messrs. J. Cheal & Sons, Ltd., for flowering and foliage shrubs.

To Mr. T. Lewis, for Rhododendrons.

Bronze Flora Medal.

To Messrs. R. Green, Ltd., for Bay trees.

IRISES.

Large Silver Cup.

To Mr. Amos Perry, for Irises, etc.

Small Silver Cup.

To Orpington Nursery Co., for Irises, etc.

Silver Lindley Medal.

To Messrs. H. Chapman, Ltd., for Irises, etc.

Silver-gilt Banksian Medal.

To Messrs. G. Bunyard & Co., Ltd., for Iris garden.

Silver Flora Medal.

To Mr. G. G. Whitelegg, for Iris garden.

FRUIT AND VEGETABLES.

Gold Medal.

To Messrs. G. Bunyard & Co., Ltd., for fruit in baskets.

To The Hon. Vicary Gibbs (gr. E. Beckett), for vegetables.

To Messrs. T. Rivers & Son, Ltd., for fruit trees in pots.

Large Silver Cup.

To Messrs. Laxton Bros., for pot Strawberries and gathered fruit.

FLORISTS' FLOWERS, ETC.

Gold Medal.

To Messrs. Blackmore & Langdon, for Begonias and Delphiniums.

To Messrs. James Carter & Co., for flowering plants.

To Messrs. Sutton & Sons, for flowering plants.

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Silver-gilt Flora Medal.

To Messrs. Dobbie & Co., Ltd., for Antirrhinums, etc.

Silver-gilt Banksian Medal.

To F. Aubrey Wootton, Esq., K.C., for show Pelargoniums.

Silver Flora Medal.

To Mr. A. Dawkins, for Schizanthus.

To Messrs. Godfrey & Son, for Pelargoniums, Schizanthus, etc.

Silver Banksian Medal.

To Messrs. Carter, Page & Co., for Dahlias.

To Mr. R. J. Case, for Pelargoniums.

To Mr. H. Clarke, for Violas.

To Mr. John Forbes (Hawick), for Violas, etc., and Pelargoniums.

To Mr. W. Yandell, for Violas.

Roses.

Gold Medal.

To Mr. Elisha J. Hicks, for pot Roses.

Small Silver Cup.

To Messrs. Ben. R. Cant & Sons, for Roses.

To Messrs. Frank Cant & Co., for Roses.

Silver-gilt Banksian Medal.

To Messrs. John Waterer, Sons & Crisp, Ltd., for Roses.

Silver Flora Medal.

To Mr. W. Paul (Waltham Cross), for Roses.

To Messrs. Wm. Cutbush & Son, for Roses.

To Mr. George Prince, for Roses.

To Rev. J. H. Pemberton, for pot and cut Roses.

To Messrs. J. Piper & Son, for Roses, etc.

Silver Banksian Medal.

To Messrs. E. Paul & Co., for Roses.

To Mr. Charles Turner, for Roses.

ROCK GARDENS. .

Gold Medal.

To Mr. B. H. B. Symons-Jeune, for rock garden.

To Mr. G. G. Whitelegg, for rock garden.

Large Silver Cup.

To Messrs. R. Tucker & Son, for rock garden.

Silver-gilt Flora Medal.

To Messrs. Clarence Elliott, Ltd., for rock garden.

To Messrs. Hodson's, Ltd., for rock garden.

To Messrs. Pulham & Sons, for rock and water garden.

Silver-gilt Banksian Medal.

To Messrs. T. R. Hayes & Sons, for rock and water garden.

Silver Banksian Medal.

To Messrs. Wm. Cutbush & Son, for rock garden.

ALPINE PLANTS.

Silver-gilt Lindley Medal.

To Mr. John Macwatt, for Primulas.

Small Silver Cup.

To Messrs. Clarence Elliott, Ltd., for alpine plants,

To Mr. R. Prichard, for rock and alpine plants.

Silver-gilt Flora Medal.

To Messrs. John Waterer, Sons & Crisp, for alpine plants.

Silver-gilt Banksian Medal.

To Messrs. Carter Page & Co., for alpine plants.
 To The Misses Hopkins, for alpine plants.
 To Messrs. Oliver & Hunter, for alpine plants.
 To Messrs. W. H. Rogers & Sons, for alpine plants.
 To Mr. G. G. Whitelegg, for alpine plants.
 To Mr. E. Dixon, for miniature garden.

Silver Flora Medal.

To Mr. H. Hemsley, for rock and alpine plants, etc.
 To Mr. E. Scaplehorn, for rock plants.
 To Messrs. R. Tucker & Sons, for alpine plants.

Silver Banksian Medal.

To Messrs. J. Piper & Son, for alpine plants.
 To Mr. W. Wells, jun., for alpine plants.

GREENHOUSE PLANTS.

Gold Medal.

To Mr. H. J. Jones, for Hydrangeas.
 To Mr. L. R. Russell, for stove plants.

Large Silver Cup.

To Messrs. E. Webb & Sons, for stove and greenhouse plants.

Small Silver Cup.

To Messrs. J. Peed & Son, for Caladiums, etc.

Silver-gilt Flora Medal.

To Baron Schröder, for Calceolarias, etc.

Silver-gilt Banksian Medal.

To Messrs. Wm. Cutbush & Son, for Hydrangeas and Carnations.
 To Mr. S. Smith, for Cacti, etc.
 To Miss Worth, for succulents.

Silver Flora Medal.

To Messrs. Stuart Low & Co., for stove and New Holland plants.

Silver Banksian Medal.

To Mr. H. N. Ellison, for Cacti, etc.

Bronze Flora Medal.

To Mr. E. H. Causer, for Fuchsias, etc.

SCIENTIFIC EXHIBITS.

Silver Lindley Medal.

To Mr. F. T. Brooks, for exhibit showing Silver Leaf Disease.
 To Messrs. G. Bunyard & Co., Ltd., for exhibit showing species of Currants.
 To Dr. M. C. Rayner, for exhibit showing the fungus partner of Heather.

GENERAL MEETING.

JUNE 12, 1923.

C. T. MUSGRAVE, Esq., in the Chair.

Four hundred and thirty-three Fellows and nineteen Associates were elected,
 and ten Societies affiliated.

GENERAL MEETING.

JUNE 26, 1923.

The Hon. H. D. McLAREN in the Chair.

Fifty-two Fellows were elected, and three Societies affiliated.
A lecture was given by Miss M. Rutherford Jay on "American Gardens."

COMPETITION FOR STRAWBERRIES.

Silver Bunyard Medal.

To Mrs. R. W. Ascroft, Orchard Cottage, Effingham.

The Clay Challenge Cup.

Presented by Messrs. Clay for a Rose of good form and colour not in commerce possessing the true old Rose scent, such as may be found in the old Cabbage or Provence Rose, in 'General Jacqueminot,' 'Marie Baumann,' 'Duke of Wellington,' 'General McArthur,' etc. The scent known as 'Tea Rose' is not, for this competition, to be accounted the true old Rose scent. Not more than three different varieties may be shown by any one competitor, but at least three and not more than six cut blooms of each variety. The Cup will only be awarded once for the same Rose. In 1914 it was awarded to 'Queen of Fragrance' (Messrs. Wm. Paul), in 1915 to 'Colcestria' (Messrs. B. Cant), in 1921 to 'Prince of Wales' (Messrs. W. Easlea & Sons), and in 1922 to 'Henry Nevard' (Messrs. Frank Cant & Co.).

1923. To Messrs. Frank Cant & Co., for 'Rosemary.'

SCIENTIFIC COMMITTEE.

JANUARY 16, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, and seven members present.

The only things before the Committee were a fasciated stem of common Asparagus which had been found growing on the sand at Skegness, and a burr about three inches in diameter from the stem of a Bullace shown by Mr. Fraser.

SCIENTIFIC COMMITTEE, JANUARY 30, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, and five members present.

Mentha forms.—Mr. Fraser showed dried specimens of *Mentha aquatica* of Smith, var. *acutifolia*, *M. rivalis*, *M. praecox*, and other forms from British localities.

Form of Daphne Mezereum.—Mr. Wilks showed a dark purple form of *Daphne Mezereum* which he had raised from seed at Shirley.

Proliferous larch cones.—Mr. Bowles showed, from Brickendon Grange, cones of *Larix europaea* with the axis projecting beyond the cone, and stated that the tree always produced similar cones.

Crocus hybrid.—He also showed flowers of a hybrid of *Crocus Mountaini* which had appeared among some bulbs of Mr. Barr's.

SCIENTIFIC COMMITTEE, FEBRUARY 13, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, five other members and
Mr. VAN DE WEYER (*visitor*) present.

Helleborus odorus.—Mr. W. G. Baker showed this uncommon species which had been growing in the Oxford Botanic Garden for many years, but is rarely seen in English gardens.

Buddleia asiatica.—Mr. A. Hosking showed flowering sprays of the very sweet scented *Buddleia asiatica*, a plant hardy only in the warmer parts of the country.

Leucojum vernum, &c.—The Rev. W. Wilks exhibited flowers of *Leucojum vernum* from his garden, where they were growing in very wet places. He had collected them on the Continent, and found that in his garden they often produced more than the typical number of flowers, as in the variety *carpathicum*. He also showed very large leaves of *Cyclamen neapolitanum* from his garden.

Forms of Mentha.—Mr. J. Fraser exhibited dried specimens of wild and cultivated forms of *Mentha rubra* and *M. gentilis* to show the range of variation found therein.

SCIENTIFIC COMMITTEE, FEBRUARY 27, 1923.

Rev. W. WILKS, M.A., V.M.H., in the Chair, and eight members present.

Fruiting branch of Ficus stipulata.—Mrs. Westby, of Roebuck Castle, Dundrum, Co. Dublin, sent a flowering branch of *Ficus stipulata* (*F. repens*), showing the large foliage and erect habit of the mature form of this species, which are in such remarkable contrast to the juvenile creeping stage commonly grown.

Salix sp.—Mr. J. Fraser showed specimens of *Salix cinerea* to illustrate the range of variation existing in this species, from a form approaching *Salix repens* in appearance but differing in morphological details to a large form which sprang up after a fire on Epsom Downs, with growths in the nature of stool shoots.

Rooted leaf of Ivy.—Mr. T. H. Dipnall sent a leaf of Ivy which he had found while weeding a bed of Violets and which had produced roots, but no bud.

XXXIV PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

SCIENTIFIC COMMITTEE, MARCH 13, 1923.

Dr. A. B. RENDLE, M.A., V.M.H., in the Chair, seven other members and Mr. VAN DE WEYER (*visitor*) present.

The Rev. W. Wilks.—The Chairman expressed the deep sense of loss which the Committee felt in the death of the Rev. William Wilks, who all through his long official connexion with the Society fostered the union of practice of horticulture with science, and with his usual far-sightedness did his utmost to bring about the development of scientific investigation under the Society's auspices. The Committee desired that a letter of condolence should be sent to his relatives.

Clematis Armandi.—Mr. W. G. Baker showed flowering specimens of this ornamental evergreen species from an outside wall in the Oxford Botanic Garden, where its sweet-scented flowers had been open since early January.

Coloured Primroses, &c.—Mr. Hosking inquired regarding the origin of *Primula Sibthorpii*, and some conversation took place relating to the methods of inheritance of the blue colour and doubling. Mr. Van de Weyer said that he found that on crossing a single with a double all the progeny were single, but that on the resulting single form being selfed a proportion of double seedlings resulted. He also found that the crossing of a white Polyanthus with a blue Primrose gave rise to magenta-flowered seedlings from which blue Polyanthus might be raised.

Menthas.—Mr. Fraser exhibited dried specimens of *Mentha acutifolia* and nearly allied forms, some of them apparently hybrids with *arvensis*, and made some critical remarks upon them.

SCIENTIFIC COMMITTEE, MARCH 27, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, and six members present.

Narcissus with outgrowths on corona.—A Daffodil was sent having six cut-like outgrowths on the outside of the corona just below its mouth.

Wild plants.—Mr. Marsden Jones showed examples of *Narcissus pseudonarcissus* which is abundant (but not apparently variable) in a wood near the New Forest; *Crocus vernus* from a meadow at Studland, where it has been established for at least 150 years; a fine form of *Armeria maritima* which he had found growing wild; a green Primrose originally found wild in Dorset and removed to a garden.

Nomenclature of garden plants.—Notice was given that at the next meeting the Committee would be asked to nominate members of a sub-committee upon the nomenclature of garden plants, especially to consider the question of the retention of various generic names or their alteration to bring them in line with the most modern ideas of systematic botanists.

SCIENTIFIC COMMITTEE, APRIL 10, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, and seven members present.

Pinus Thunbergii.—Mr. Loder showed a fruiting branch of *Pinus Thunbergii* to draw attention to the close grouping of the cones in this species, as many as sixty at times occurring in a cluster.

Coloured Primrose.—Mr. Arkwright showed the flower double the usual size, of a chocolate form of Primrose, as an example of seedlings he was obtaining by using the fine form 'Evelyn Arkwright' as a parent. He found that seedlings of 'Evelyn Arkwright' selfed were invariably thrum-eyed, but pin-eyed seedlings had been raised.

Alleged Potato-tomato hybrid.—Mr. Hosking showed seedlings of the alleged Solanum hybrid shown last year with a tomato-like fruit. The seedlings which are being grown on are distinct from the ordinary tomato in every way.

'Witches Broom' on Elder.—Mrs. O. Legg, of Marquess Road, N., sent a curiously bunched growth of the common Elder which had arisen from a rather slender shoot. The probable cause of the curious growth was injury to the bud, possibly repeated injury as by a mite, although the actual cause of the trouble was not present.

Nomenclature of garden plants.—The Committee, in response to a request of the Council, nominated the following to advise upon questions of nomenclature of garden plants: Dr. Rendle, Messrs. Bowles, N. Bunyard, Chittenden, Cotton, Dykes, Hales, Hosking, and Stansfield.

SCIENTIFIC COMMITTEE, MAY 8, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, nine other members and Messrs. BARTHOLOMEW and JACOB (*visitors*) present.

Breaking of Tulips.—Mr. Jacob said that he found recently an offset 'breaking' while the parent bulb to which it was attached still produced the 'breeder' form of flower.

Frost and wind damage.—Mr. Hales drew attention to the damage done to plants at Chelsea by the recent unseasonable weather, and showed damaged specimens of *Isatis tinctoria*, Hop, *Chelidonium*, Horse-chestnut with perforated leaves, *Spiraea confusa*, *Quercus Suber* (defoliated), *Quercus Ilex*, *Pterocarya caucasica*, *Spiraea Aruncus*, Tulip, Rumex, Veratrum, Grasses, *Tradescantia*, Bamboo, *Prunus Padus*, *Hyoscyamus*, *Allium triquetrum*, and *Rosa spinosissima*.

Hybrid Anemone.—Mr. Hosking showed a hybrid between *Anemone sylvestris* (white) and *A. multifida* (pink) with larger flowers than in the latter parent and with intermediate foliage.

Larch disease.—Mr. Balfour showed a specimen of *Larix kurilensis* with typical larch disease. So far the Japanese species, *leptolepis*, had proved free from the trouble at Dawyck.

Virescent Colchicum.—Mr. Bowles showed, on behalf of Mr. Cory, *Colchicum autumnale atropurpureum* with virescent flowers with purplish tips. This seems to be the usual form found in autumn-flowering Colchicums when flowers are produced in spring. Mr. Bowles has the same thing in *C. variegatum*.

Viola lutea forms.—Mr. Lofthouse sent a number of flowers of forms of *Viola lutea* which he had found growing in Teesdale, some of them exceedingly pretty.

Orvala lamiooides.—Mr. Bowles showed a curious congested plant of *Orvala lamiooides* which had occurred several years in succession in his garden without visible cause.

Albino Sweet Pea.—Mrs. Tisdall showed an albino seedling of Sweet Pea 'Royal Purple.' One of twenty-six had come up shrimp-pink and was now almost white, with a very faint tinge of green and much dwarfed.

SCIENTIFIC COMMITTEE, MAY 29, 1923.

AT CHELSEA.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, three other members with
Mr. LOFTHOUSE (*visitor*) present.

Forms of Viola lutea, &c.—Mr. Lofthouse showed varieties of *Viola lutea* collected by him in Teesdale. Great variation in colour was exhibited by the plants shown.

He also showed a Saxifrage from the same district, belonging to *S. caespitosa* apparently, but with rosette form of growth.

Various plants.—Mr. Marsden Jones showed a variegated form of *Plantago lanceolata* and another with inflorescence branched at the base; *Ranunculus bulbosus* with extremely pale, nearly white flowers; *Leontodon autumnale* with very pale lemon flowers; a pink *Ajuga reptans*; *Ranunculus parviflorus* and *Gentiana lindulata praecox*.

SCIENTIFIC COMMITTEE, JUNE 12, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, seven other members and
Mr. VAN DE WEYER present.

Salix galls.—Mr. J. Fraser showed a specimen of *S. repens* with galls produced by *Eriophyes triradiatus*, similar to those on many trees of *S. fragilis* around London. He also showed another very woolly one on the male catkins of *S. triandrus*, the maker of which has not been identified.

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Malformed Plantago lanceolata.—Mr. Fraser showed an inflorescence of *P. lanceolata*, in which every inflorescence of the plant bore leafy bracts.

Plants from Kenya.—Mr. Van de Weyer showed a species of *Senecio* from just below the snow-line on Mt. Kenya which was flowering freely in his Dorset garden, *Ansellia africana*, and *Gloriosa Rothschildiana*.

Buddleia hybrids.—He also showed second-generation seedlings of the hybrids between *B. globosa* and *B. brasiliensis* with globular heads of flowers varying in shades of yellow among themselves.

Hybrid Irises.—Mr. Amos Perry showed several hybrid Irises raised by crossing *I. chrysographes*, *I. Bulleyana*, and *I. Forrestii*, all plants of the *I. sibirica* group.

SCIENTIFIC COMMITTEE, JUNE 26, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, two other members and Messrs. HAY and LOWE (*visitors*) present.

Staminate Vitis.—Mr. J. Fraser showed a seedling *Vitis* which produced staminate flowers only, and remarked that most species of *Vitis* were polygamous.

Mentha vars.—He also showed *Mentha piperita* and its two varieties *vulgaris* and *officinalis*. He found that plants collected in the north are usually more hairy than those found in the south. Some authorities considered *M. piperita* a hybrid between *M. aquatica* and *M. viridis*.

Carnation with contorted fasciated stem, from Messrs. Lowe & Gibson, showed considerable shortening of the nodes and spiral contortion such as is sometimes seen in Teasels.

Campanula Medium.—Examples of plants grown in pots and trained fanwise, from Mr. Bridget, showed heterophylly of the leaves and bracts such as is often seen in poor forms of this species.

FRUIT AND VEGETABLE COMMITTEE.

JANUARY 16, 1923.

Mr. C. G. A. NIX, V.M.H., in the Chair, and twenty-two members present.

Awards Recommended :—*Gold Medal.*

To Messrs. J. C. Allgrove, Langley, for collection of Apples and Pears.
 To Messrs. Geo. Bunyard, Maidstone, for collection of Apples and Pears.

Silver-gilt Knightian Medal.

To Messrs. Sutton, Reading, for Vegetables.

Award of Merit (Provisional).

To Apple 'Ball's Pippin' (votes unanimous), from Messrs. J. C. Allgrove, Langley. A medium-sized dessert variety, in season until March, the parentage being Cox's Orange Pippin x Sturmer Pippin. Fruits round, flattish, even, greenish-yellow, with a crimson flush over the greater part of the fruit, and very faint stripes. Eye open in a deep, even basin, stalk short in a broad cavity. Flesh firm, white, juicy, of very good flavour. The tree is said to be a free cropping, strong grower. The award is provisional, subject to a favourable report by a deputation which will inspect the tree later.

Other Exhibits.

H. S. Stone, Esq., Reigate : Apple for opinion.

Mr. J. Richardson, Leake : Apple for opinion.

Messrs. Westmacott, London : preserves.

Miss H. C. Sewell, Kensington : preserves.

Mrs. Millar, Marlow : preserves.

Miss D. Carter, Peasmarsh : preserves.

Messrs. J. C. Allgrove, Langley : Apple 'S. T. Wright' and 'Newton Wonder' bud sport.

Messrs. Stuart Low, Mill Hill : Apple 'Kentish Quarrenden.'

FRUIT AND VEGETABLE COMMITTEE, JANUARY 30, 1923.

Mr. C. G. A. NIX, V.M.H., in the Chair, and twenty-three members present.

Award Recommended :—*Silver-gilt Knightian Medal.*

To Messrs. Sutton, Reading, for Potatos.

The following varieties of fruits were recommended for inclusion in the Commercial Fruit Trials at Wisley :—

Apples : 'Joy Bells,' 'Ball's Pippin,' 'S. T. Wright,' 'Encore,' 'John Standish,' 'Peter Lock,' 'Rosemary Russet,' 'Herring's Seedling,' 'Victory,' 'Cutler Grieve,' 'Ontario,' 'Wagener,' 'Heusgen's Golden Reinette,' 'St. Cecilia.'

Cherries : 'Peggy Rivers,' 'Geant d'Hedelfingen,' 'Bigarreau de Schrecken.'

Plum : 'Utility.'

Other Exhibits.

Miss H. C. Sewell, Kensington : preserves.

Mrs. Millar, Marlow : preserves.

Miss D. Carter, Peasmarsh : preserves.

Messrs. Westmacott, London : preserves.

Mr. F. H. Webster, Stock : Apple 'Xmas Beauty.'

Mr. F. P. Edwards, Southgate : Apple 'Northern Heights.'

R.H.S. Gardens, Wisley : Leeks.

The recommendations made by the Sub-Committee visiting Wisley to judge the trial of Leeks were confirmed (see JOURNAL, vol. 48, p. 236).

XXXVIII PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

FRUIT AND VEGETABLE COMMITTEE, FEBRUARY 13, 1923.

Mr. C. G. A. NIX, V.M.H., in the Chair, and twenty-six members present.

Awards Recommended :—

Gold Medal.

To Messrs. T. Rivers, Sawbridgeworth, for Citrus fruits.

Silver Knightian Medal.

To Messrs. Dobbie, Edinburgh, for Potatos.

To Messrs. Westmacott, London, for Cape fruits.

Apple 'Arthur W. Barnes,' from the Duke of Westminster (gr. Mr. N. F. Barnes), Chester, was recommended for inclusion in the Commercial Fruit Trials at Wisley.

Other Exhibits.

W. Butcher, Esq., Angmering : Grape 'Ecclesden.'

F. E. Hare, Esq., Coleshill : seedling Apple.

Mr. H. Ballington, Matlock : Apple 'Derbyshire Peach.'

Mr. A. J. Hayson, Sandwich : Shallots for opinion.

Mr. W. H. Divers, Surbiton : Apples 'St. George' and 'James Stubble.'

The Duke of Westminster (gr. Mr. N. F. Barnes) : Apple 'Millicent.'

FRUIT AND VEGETABLE COMMITTEE, FEBRUARY 27, 1923.

Mr. J. CHEAL, V.M.H., in the Chair, and eighteen members present.

No awards were recommended on this occasion.

Apple 'Crawley Beauty,' from Messrs. Cheal, Crawley, was recommended for inclusion in the Commercial Fruit Trials at Wisley.

Exhibits.

Mr. H. B. Webber, Ipplepen : Apple 'Philip Bow.'

Messrs. Westmacott, London : Cape fruits.

FRUIT AND VEGETABLE COMMITTEE, MARCH 13, 1923.

Mr. C. G. A. NIX, V.M.H., in the Chair, and nineteen members present.

Award Recommended :—

Silver Knightian Medal.

To Messrs. Sutton, Reading, for vegetables.

Other Exhibits.

Messrs. Westmacott, Strand, London : Cape fruits.

Messrs. Veitch, Exeter : Apple 'Lord Hindlip.'

FRUIT AND VEGETABLE COMMITTEE, MARCH 27, 1923.

Mr. C. G. A. NIX, V.M.H., in the Chair, and fifteen members present.

No awards were recommended on this occasion.

Exhibits.

Miss Onslow, Send Grove, Woking : seedling Apple.

Mr. G. W. Miller, Wisbech : Rhubarb 'The Sutton.'

Messrs. Westmacott, Strand, London : Cape fruits.

Messrs. Veitch, Exeter : Apple 'Lord Burghley.'

FRUIT AND VEGETABLE COMMITTEE, APRIL 10, 1923.

Mr. C. G. A. NIX, V.M.H., in the Chair, and twenty-two members present.

No awards were recommended on this occasion.

Exhibits.

Messrs. Westmacott, Strand, London : Cape fruits.
 Mr. J. Grandfield, Mill Hill Park, Acton : Cider Apples.
 Messrs. Veitch, Exeter : Apple 'Newtown Pippin.'
 R.H.S. Gardens, Wisley : Rhubarb.

FRUIT AND VEGETABLE COMMITTEE, APRIL 24, 1923.

Mr. J. CHEAL, V.M.H., in the Chair, and sixteen members present.

No awards were recommended on this occasion.

Exhibits.

Messrs. Westmacott, Strand, London : Cape fruits.
 Mr. G. Appleton, Northwich : Rhubarb 'Appleton Red.'
 Mr. T. Hancock, Mansfield : Rhubarb 'Hancock's Early Crimson Grooveless.'

FRUIT AND VEGETABLE COMMITTEE, MAY 8, 1923.

Mr. C. G. A. NIX, V.M.H., in the Chair, and twenty-one members present.

Awards Recommended :—

Silver-gilt Knightian Medal.
 To Messrs. Sutton, Reading, for Vegetables.
Silver Hogg Medal.
 To Messrs. Laxton, Bedford, for Strawberries.

Other Exhibits.

Messrs. Westmacott, Strand, London : Cape fruits.

FRUIT AND VEGETABLE COMMITTEE, MAY 29, 1923.

AT CHELSEA.

Mr. C. G. A. NIX, V.M.H., in the Chair, and twenty-four members present.
 There were no exhibits before the Committee on this occasion.

FRUIT AND VEGETABLE COMMITTEE, JUNE 12, 1923.

Mr. C. G. A. NIX, V.M.H., in the Chair, and thirteen members present.

Award Recommended :—

Silver-gilt Hogg Medal.
 To Major Pam, Wroxboro, for Melons.

FRUIT AND VEGETABLE COMMITTEE, JUNE 26, 1923.

Mr. C. G. A. NIX, V.M.H., in the Chair, and eleven members present.

Awards Recommended :—

Silver Knightian Medal.
 To Messrs. Barr, Covent Garden, for vegetables.
Silver Bunyard Medal.
 To Mrs. Ascroft, Effingham, for Strawberries.

Other Exhibit.

Mrs. Smith, Chigwell, Grapes for opinion.

FLORAL COMMITTEE.

JANUARY 16, 1923.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-five members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Sutton, Reading, for Hyacinths, etc.

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Blackmore & Langdon, Bath, for Cyclamen, etc.

To Rt. Hon. Lord Lambourne, Romford, for Carnations.

Silver Banksian Medal.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Messrs. S. Low, Bush Hill Park, for Carnations and other greenhouse plants.

To Messrs. Waterer, Sons & Crisp, Twyford, for hardy plants.

Award of Merit.

To Cyclamen 'Firefly' (votes 14 for), from Messrs. Sutton, Reading. A very free-flowering variety, bearing intense salmon-scarlet flowers of medium size. The foliage is beautifully marked.

Other Exhibits.

Mr. G. Carpenter, Byfleet : Chrysanthemum 'Louisa Pocket.'

Messrs. Cheal, Crawley : shrubs and hardy plants.

Messrs. Cutbush, Barnet : rock garden.

Messrs. Cuthbert, Southgate : Hyacinths.

Mrs. Lloyd Edwards, Trevor : two seedling Saxifrages resulting from crosses between *S. Grisebachii* and *S. Burseriana*, and also a seedling from a cross between a good seedling form of *S. Burseriana* and *S. lilacina*.

Mr. A. G. Halsted, Blandford : Violets.

Mr. G. Harrow, Kingston Hill : *Crataegus (Pyracantha) crenulata yunnanensis*.

Misses Hopkins, Shepperton : hardy plants.

Messrs. Luxford, Harlow : P. F. Carnation 'Cheerful' and Chrysanthemum 'Yvette.'

Mr. G. W. Miller, Wisbech : Polyanthus.

Messrs. Paul, Waltham Cross : Camellias.

Mr. G. Reuthe, Keston : hardy plants.

Messrs. L. R. Russell, Richmond : Azaleas.

Messrs. M. Stevens, London : Azaleas and Ericas.

Messrs. Wallace, Tunbridge Wells : conifers, etc.

Messrs. Whitelegg, Chislehurst : conifers, etc.

FLORAL COMMITTEE, JANUARY 30, 1923.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Carter, Raynes Park, for Irises, Hyacinths, etc.

To Messrs. Cuthbert, Southgate, for Hyacinths.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Messrs. Waterer, Sons & Crisp, Twyford, for hardy plants.

Silver Banksian Medal.

- To Messrs. Cutbush, Barnet, for rock garden.
- To Messrs. S. Low, Bush Hill Park, for Carnations and other greenhouse plants.
- To Messrs. Paul, Waltham Cross, for Camellias.
- To Messrs. Russell, Richmond, for forced shrubs, etc.
- To Messrs. Wallace, Tunbridge Wells, for conifers and other hardy plants.

Bronze Banksian Medal.

- To Major Pat à Beckett, Catford, for miniature Japanese gardens.
- To Mr. G. W. Miller, Wisbech, for Polyanthus, etc.
- To Messrs. Tucker, Oxford, for alpines.

Other Exhibits.

- Messrs. Baker, Codshall : Primula 'Wanda' and miniature rock garden.
- Messrs. Barr, Taplow : hardy plants.
- Messrs. Cheal, Crawley : hardy plants.
- Messrs. Gill, Falmouth : *Primula Winteri* and Rhododendrons.
- Misses Hopkins, Shepperton : hardy plants.
- Messrs. Carter Page, London : hardy plants.
- Messrs. Prichard, Christchurch : hardy plants.
- Mr. G. Reuthe, Keston : hardy plants.
- Messrs. M. Stevens, London : Azaleas, Hyacinths, etc.

FLORAL COMMITTEE, FEBRUARY 13, 1923.

Mr. H. B. May, V.M.H., in the Chair, and thirty-five members present.

Awards Recommended :—*Gold Medal.*

- To Messrs. Sutton, Reading, for Cyclamen.

Silver-gilt Banksian Medal.

- To Mr. C. Engelmann, Saffron Walden, for Carnations.

Silver Flora Medal.

- To Messrs. Allwood, Haywards Heath, for Carnations.
- To M. Fenwick, Esq., Stow-on-the-Wold, for alpines in pots.
- To Messrs. Paul, Waltham Cross, for Camellias.

Silver Banksian Medal.

- To Messrs. Blackmore & Langdon, Bath, for Cyclamen.
- To Messrs. Carter, Raynes Park, for Primulas and Daffodils.
- To Messrs. Cutbush, Barnet, for Azaleas and rock garden.
- To Messrs. Cuthbert, Southgate, for Azaleas and Hyacinths.
- To Miss Heathcote, Williton, for Violets.
- To Messrs. S. Low, Bush Hill Park, for Carnations and other greenhouse plants.
- To Mr. G. W. Miller, Wisbech, for hardy plants.
- To Messrs. L. R. Russell, Richmond, for forced shrubs.
- To Messrs. Tucker, Oxford, for alpines.
- To Messrs. Waterer, Sons & Crisp, Twyford, for hardy plants.
- To E. Wormald, Esq., Potters Bar, for Cyclamen.

Bronze Banksian Medal.

- To Lady Aberconway and Hon. H. D. McLaren, Tal-y-cafn, for Rhododendrons cut from the open.

First-class Certificate.

- To Rhododendron 'Ne Plus Ultra' (votes 30 for, 2 against), from Lt.-Col. Sir G. Holford, Tetbury. This splendid hybrid greenhouse Rhododendron was raised as the result of a cross between *R. javanicum* and *R. 'Duchess of Edinburgh'*, and received an Award of Merit in 1894. The plant exhibited on the present occasion was a magnificent specimen, carrying several fine trusses of rich orange-scarlet flowers.

Award of Merit.

To *Primula calciphila* (votes 24 for), from the Royal Botanic Gardens, Kew. This interesting greenhouse Primula comes from the limestone cliffs of Ichang, Western China, and was at first thought to be the wild type of *P. sinensis*, but it is now recognized as a new species. It has rosettes of smallish pale green leaves, from which arise well-furnished trusses of pale mauve stellate flowers, rather more than 1 inch across, and having well-rounded petals and a small, pale greenish eye.

To *Prunus Conradiinae* (votes 14 for, 2 against), from the Royal Botanic Gardens, Kew. A tree, beautiful alike in flower and in leaf, introduced by Mr. E. H. Wilson from Western China. The graceful branches bear the comparatively large white flowers in great numbers, and the leaves which succeed them are purplish in colour.

Other Exhibits.

Messrs. Barr, Taplow : hardy plants.

Messrs. Baker, Codsall : hardy plants.

Messrs. Cheal, Crawley : shrubs and hardy plants.

Messrs. Elliott, Stevenage : hardy plants.

Mr. A. Finlay, Romford : *Primula 'Double Crimson King.'*

Messrs. Gill, Falmouth : Rhododendrons and *Primula Winteri*.

Misses Hopkins, Shepperton : hardy plants.

Mr. J. J. Kettle, Corfe Mullen : Violets.

C. J. Lucas, Esq., Horsham : *Cornus capitata* in fruit.

Messrs. Maxwell & Beale, Broadstone : hardy plants.

Messrs. Carter Page, London : hardy plants.

Messrs. Prichard, Christchurch : hardy plants.

Mr. G. Reuthe, Keston : hardy plants.

Messrs. Skelton & Kirby, Pirbright : hardy plants.

Messrs. M. Stevens, London : Azaleas, etc.

W. Van de Weyer, Esq., Corfe Castle : *Romulea Bulbocodium alba*, found in Portugal by the exhibitor.

Messrs. Wallace, Tunbridge Wells : shrubs and hardy plants

Messrs. Whitelegg, Chislehurst : hardy plants.

Mr. F. G. Wood, Ashtead : hardy plants.

FLORAL COMMITTEE, FEBRUARY 27, 1923.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-eight members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Cuthbert, Southgate, for Hyacinths.

To Messrs. Sutton, Reading, for Cinerarias.

Silver Flora Medal.

To Messrs. C. Elliott, Stevenage, for rock garden.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Messrs. S. Low, Bush Hill Park, for Carnations and other greenhouse plants.

To Messrs. Russell, Richmond, for forced shrubs.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Misses Allen-Brown, Henfield, for Violets.

To Messrs. Carter Page, London, for hardy plants and shrubs.

To Messrs. Cutbush, Barnet, for rock garden and forced shrubs.

To Messrs. Piper, Langley, for rock garden.

To Mr. G. Reuthe, Keston, for hardy plants and shrubs.

To Messrs. M. Stevens, London, for Azaleas.

To Messrs. Prichard, Christchurch, for alpines.

To Messrs. Tucker, Oxford, for alpines.

To Messrs. Wallace, Tunbridge Wells, for flowering trees and shrubs.

To Messrs. Waterer, Sons and Crisp, Twyford, for shrubs and alpines.

Bronze Flora Medal.

To Messrs. Barr, Taplow, for hardy plants

First-class Certificate.

To *Arctostaphylos Manzanita* (votes unanimous), from the Royal Botanic Gardens, Kew. A very beautiful, hardy flowering tree or shrub from N.W. America. It has thick, leathery, dull green ovate leaves, and its small white pitcher-like flowers flushed with pink are borne in terminal panicles. The striking red bark is shed annually in spring.

Award of Merit.

To *Rhododendron cilicium* (votes 15 for, 1 against), from Mr. W. G. Baker, the Botanic Garden, Oxford. This beautiful, slightly fragrant, tender species comes from Yunnan, and bears large, widely open white flowers about 2 inches across in trusses of from 7 to 10. There is sometimes a slight tinge of pink in the flowers, and the throat is lemon yellow. There are hairs on the calyx. The leaves are elliptic obovate in shape and ciliate.

To *Rhododendron strigillatum* (votes 7 for, 3 against), from Lady Aberconway and Hon. H. D. McLaren, Bodnant, N. Wales. This handsome Chinese species makes an evergreen bush up to 20 feet high. Its shoots and leaf stalks are thickly covered with stiff glandular brown bristles. The leaves are oblong-lanceolate, with brown hairs on the under-side. The rich blood red flowers are bell-shaped, from 1½ to 2 inches long and wide, and are borne in a very neat truss. This Rhododendron requires a sheltered position, except in mild districts.

To *Saxifraga 'R. V. Prichard'* (votes 9 for), from Messrs. Prichard, Christchurch. A good white encrusted Saxifrage with a green base to the petals. It resulted from a cross between *S. Burseriana* and *S. lilacina*.

Other Exhibits.

- Messrs. Baker, Codshall : hardy plants.
- Messrs. Bunyard, Maidstone : rock garden.
- Chalk Hill Nurseries, Reading : hardy plants.
- Messrs. Cheal, Crawley : hardy plants.
- Mrs. Farrer, London : white Hippeastrum.
- Messrs. Gill, Falmouth : Rhododendrons and Anemones.
- Mrs. J. J. Goode, Cirencester : *Primula 'Hector Goode.'*
- Mr. E. J. Hicks, Twyford : Roses.
- Misses Hopkins, Shepperton : hardy plants.
- Messrs. Maxwell & Beale, Broadstone : alpines.
- Mr. G. W. Miller, Wisbech : hardy plants.
- Rev. B. Pinney, Durweston : Violets.
- B. H. B. Symons Jeune, Esq., London : *Primula Allioni*.
- Mr. W. Wells, jun., Merstham : alpines.
- Mr. F. G. Wood, Ashtead : hardy plants.

FLORAL COMMITTEE, MARCH 13, 1923.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-six members present.

Before commencing the business of the Committee, the Chairman said : "It is with unfeigned regret that I refer to the great loss horticulture has sustained by the death of Mr. Wilks. By that sad event the R.H.S. is bereft of its greatest benefactor, for it is not too much to say that the status of this great Society as we know it to-day is mainly due to his untiring energy, his great industry and sagacity. A man of many parts, his predominant characteristic was, I think, his capacity for work. Labour was to him an absorbing pleasure ; letter-writing a delightful pastime ; of his critics, few could resist the lure of his magnetic personality and the delight of his conversational charm. His great but laudable ambition was to make the Society he loved so well the greatest of its kind in the world ; who shall say that he failed ? A great figure has gone from our midst. May he rest in peace."

Awards Recommended :—*Gold Medal.*

- To Lt.-Col. Sir George Holfolk, Tetbury, for Clivias.
- To Messrs. Sutton, Reading, for Hyacinths.

Silver-gilt Flora Medal.

- To Messrs. Carter, Raynes Park, for Hyacinths, etc.

Silver Flora Medal.

To Messrs. Gill, Falmouth, for Rhododendrons.
To Messrs. S. Low, Bush Hill Park, for Carnations, etc.

Silver Banksian Medal.

To Messrs. Artindale, Sheffield, for *Primula obconica*.
To Messrs. C. Elliott, Stevenage, for rock garden.
To Messrs. Cuthbert, Southgate, for Hyacinths.
To Mr. E. J. Hicks, Twyford, for Roses.
To Mr. G. Reuthe, Keston, for hardy plants.
To Messrs. L. R. Russell, Richmond, for flowering shrubs and alpines.
To Messrs. Wallace, Tunbridge Wells, for flowering shrubs.

Award of Merit.

To Clivia 'Field-Marshal' (votes unanimous), from Lt.-Col. Sir G. Holford, Tetbury. This handsome variety bears many-flowered trusses of bright salmon-orange flowers with yellow throats.

To Clivia 'Lady Holford' (votes 11 for), from Lt.-Col. Sir G. Holford, Tetbury. Another handsome variety, with large pale apricot flowers.

To Clivia 'Westonbirt Perfection' (votes unanimous), from Sir G. Holford, Tetbury. The flowers of this variety are bright orange, with soft yellow throats. They are of large size and are borne in magnificent trusses.

To Saxifraga 'Valerie Keevil' (votes 9 for, 3 against), from Messrs. M. Prichard, Christchurch. A very pretty Saxifrage resulting from a cross between *S. Godroniana* and *S. lilacina*. It has tiny rosettes of very small narrow leaves, and the rounded, deep-rose flowers with deeper centres are borne on stems about 3 inches high.

Other Exhibits.

Messrs. Allwood, Haywards Heath : Carnations.
Messrs. Baker, Codswall : alpines and miniature rock garden.
Messrs. Barr, Taplow : flowering shrubs, etc.
Chalk Hill Nurseries, Reading : hardy plants.
Messrs. Cheal, Crawley : conifers, shrubs and alpines.
Messrs. Cutbush, Barnet : rock garden and Azaleas.
Donald Nursery Co., Newcastle : *Pernettya mucronata* 'Bell's Seedling'.
Mr. C. Engelmann, Saffron Walden : Carnations.
Misses Hopkins, Shepperton : hardy plants.
Mr. J. J. Kettle, Corfe Mullen : Violet 'Princess Mary'.
Royal Botanic Gardens, Kew : *Stachyurus chinensis*.
Messrs. Maxwell & Beale, Broadstone : hardy plants.
Mr. G. W. Miller, Wisbech : hardy plants.
Messrs. Carter Page, London : alpines.
Rev. B. Pinney, Durweston : Violets.
Messrs. Piper, Langley : flowering shrubs and hardy plants.
Messrs. Prichard, Christchurch : hardy plants.
Mr. G. Prince, Longworth : Roses.
Mrs. Raikes, Bergh Apton : seedling *Pelargonium*.
Messrs. Rogers, Southampton : hardy plants.
L. de Rothschild, Esq., Exbury : seedling Rhododendrons.
M. Stevens, Esq., Ewhurst : seedling Rhododendrons.
Messrs. Tucker, Oxford : alpines.
Mr. C. Turner, Slough : *Laurus nobilis* in fruit.
Messrs. Waterer, Sons & Crisp, Twyford : hardy plants.
Mr. W. Wells, jun., Merstham : alpines.
Mr. F. G. Wood, Ashtead : hardy plants.

FLORAL COMMITTEE, MARCH 27, 1923.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-one members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Cutbush, Barnet, for rock garden and forced shrubs.
To Messrs. S. Low, Bush Hill Park, for Carnations and greenhouse plants.
To Mr. G. Reuthe, Keston, for Rhododendrons and alpine plants.
To Messrs. L. R. Russell, Richmond, for stove and greenhouse plants.

Silver Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for Polyanthus.
 To Messrs. B. R. Cant, Colchester, for Roses.
 To Mr. C. Engelmann, Saffron Walden, for Carnations.
 To Messrs. Gill, Falmouth, for Rhododendrons.
 To Mr. E. J. Hicks, Twyford, for Roses.
 To Messrs. Carter Page, London, for alpines.
 To Messrs. Piper, Langley, for hardy plants.
 To Messrs. M. Stevens, London, for Roses, Azaleas, etc.
 To Messrs. Wallace, Tunbridge Wells, for forced shrubs.
 To Mr. F. G. Wood, Ashtead, for alpines.

Bronze Flora Medal.

To Mr. G. W. Miller, Wisbech, for hardy plants.
 To Messrs. Reamsbottom, Geashill, for Anemones.

First-class Certificate.

To *Pieris taiwanensis* (votes unanimous), from the Marquis of Headfort, Kells, Co. Meath. This white-flowered evergreen shrub, introduced from Formosa by Mr. E. H. Wilson in 1918, received an Award of Merit on March 14, 1922. Its promise of hardiness has so far been well maintained, and the plants shown on the present occasion were much larger and better specimens than those seen before. A description of the plant appears in the R.H.S. JOURNAL, 48, page xliv.

To *Prunus Bliricana fl. pl.* (votes unanimous), from Mr. R. C. Notcutt, Woodbridge. This beautiful early-flowering tree, bearing semi-double pink flowers in great profusion, received an Award of Merit (April 7, 1914). The shoots are of a dark purplish colour, and the foliage is purple tinted as in *P. Pissardii*. A description of the plant appears in the R.H.S. JOURNAL, 49, page lxii.

Award of Merit.

To *Berberis replicata* (votes 17 for), from the R.H.S. Gardens, Wisley. A very free-flowering species bearing greenish-yellow flowers all along the gracefully arching branches. The plant was raised from seed collected by Mr. G. Forrest at an altitude of 11,000 feet in open scrub on the Shweli-Salween divide in China. Its small evergreen leaves are grey below, and have recurved margins. Up to the present the plant has proved to be quite hardy (fig. 13).

To *Rhododendron rhododactylum* (votes 16 for) from Lady Aberconway and Hon. H. D. McLaren, Bodnant, N. Wales. A hardy species from China. The flowers are of medium size, campanulate in shape, white streaked with pink, and are borne in trusses of about seven. The small dark-green leaves are covered with brown tomentum on the under-sides.

To *Saxifraga Grisebachii 'Wisley Variety'* (votes 10 for), from Messrs. Clarence Elliott, Stevenage. This handsome form is much larger than the type, and its arched flower-stems, furnished with beautiful crimson bracts, rise from pretty rosettes of silvery foliage. The height of the plant in flower is about 6 inches.

Other Exhibits.

Mr. H. Austin, Aberystwyth : blue Polyanthus.
 Messrs. Baker, Codswall : hardy plants.
 Mrs. Barnard, Towcester : Polyanthus.
 Messrs. Barr, Taplow : hardy plants.
 Mrs. Botfield, Alblighton : Primulas.
 Messrs. F. Cant, Colchester : Roses.
 Chalk Hill Nursery, Reading : hardy plants.
 Messrs. Cheal, Crawley : hardy plants.
 L. Currie, Esq., Farnborough : Carnation 'Mrs. Lawrence Currie.'
 Hon. Vicary Gibbs, Elstree : *Prunus Conradiæ*.
 C. E. Heath, Esq., Holmwood : Rhododendrons.
 Misses Hopkins, Shepperton : alpines.
 Mrs. Heywood Johnstone, Pulborough : Rhododendrons.
 Trustees of the Leonardslee Estate, Horsham : *Rhododendron Falconeri* hybrid.
 G. W. E. Loder, Esq., Ardingly : *Saxifraga latipetiolata*.
 Messrs. Luxford, Harlow : Carnations.

Messrs. Maxwell & Beale, Broadstone : hardy plants.
Rev. B. Innay, Durweston : Violets.
Messrs. M. Prichard, Christchurch : alpines.
Mr. G. Prince, Oxford : Roses.
Messrs. Rogers, Southampton : hardy plants.
Messrs. Sutton, Reading : Cinerarias and Freesias.
Mr. G. G. Whitelegg, Chislehurst : alpines.

FLORAL COMMITTEE, APRIL 10, 1923.

Mr. H. B. May, V.M.H., in the Chair, and twenty-eight members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Mr. J. Douglas, Great Bookham, for Auriculas.

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Messrs. Cutbush, Barnet, for rock garden and forced shrubs.
To Mrs. Heywood Johnstone, Pulborough, for Rhododendrons.
To Messrs. Carter Page, London, for alpines.
To Messrs. Piper, Langley, for hardy plants.
To Messrs. M. Prichard, Christchurch, for alpines.
To Messrs. L. R. Russell, Richmond, for forced shrubs.

Silver Banksian Medal.

To Messrs. B. R. Cant, Colchester, for Roses.
To Mr. C. Engelmann, Saffron Walden, for Carnations.
To Mr. E. J. Hicks, Twyford, for Roses.
To Messrs. S. Low, Bush Hill Park, for Carnations and other greenhouse
plants.
To Lieut.-Col. Messel, O.B.E., Handcross, for seedling Rhododendrons.
To Mr. G. W. Miller, Wisbech, for Polyanthus, etc.
To Mr. G. Reuthe, Keston, for Rhododendrons.
To Messrs. Rogers, Southampton, for hardy plants.
To Messrs. Tucker, Oxford, for alpines.
To Messrs. Waterer, Sons & Crisp, Twyford, for hardy plants.

Bronze Flora Medal.

To Chalk Hill Nurseries, Reading, for hardy plants.
To Messrs. Cheal, Crawley, for hardy plants.
To Messrs. C. Elliott, Stevenage, for alpines.
To Mr. G. Prince, Oxford, for Roses.
To Mr. F. G. Wood, Ashtead, for hardy plants.

Bronze Banksian Medal.

To Misses Hopkins, Shepperton, for rock garden.
To Messrs. Reamsbottom, Geashill, for Anemones.

Award of Merit.

To Rhododendron 'Exminster' (votes 14 for), from Messrs. R. Veitch, Exeter. This handsome hybrid was raised as the result of a cross between *R. Thomsonii* and *R. campylocarpum*, and its large campanulate flowers are cream coloured, heavily flushed with pink.

Cultural Commendation.

To Mrs. O'Hea, Barford, for a magnificent plant of Cyclamen, 'Mrs. Buckston,' a very pretty salmon-pink frilled variety.

TRIAL OF WINTER-FLOWERING CARNATIONS AT WISLEY.

The following awards were recommended by a Judging Committee representing the R.H.S. Floral Committee and the Carnation Society, after examination of the growing plants on four occasions spread over two winter seasons, 1921-2, 1922-3.

The Awards are recommended solely on the value of the plants for flowering between October and March, and take into consideration form and colour of the flowers, habit, vigour, constitution, and floriferousness of the plants. They are not intended to mark value as exhibition flowers, nor as summer-flowering plants.

Award of Merit.

- Nos. 1, 2. 'Wivelsfield White,' sent by Messrs. Allwood, Engelmann.
- Nos. 3, 4. 'White Wonder,' sent by Messrs. Allwood, Engelmann.
- No. 16. 'Iceberg,' sent by Mr. Jones.
- Nos. 35, 36. 'Mrs. Walter Hemus,' sent by Messrs. Engelmann, Allwood.
- Nos. 86, 97. 'Enchantress Supreme,' sent by Messrs. Allwood, Engelmann.
- No. 94. 'Bona,' sent by Mr. Engelmann.
- No. 132. 'The Herald,' sent by Mr. Engelmann.
- No. 141. 'General Joffre,' sent by Mr. Engelmann.
- No. 154. 'Aviator,' sent by Mr. Engelmann.
- Nos. 158, 159. 'Triumph,' sent by Messrs. Allwood, Engelmann.
- No. 228. 'Jazz,' sent by Mr. Engelmann.
- *No. 250. 'Atlantic,' sent by Messrs. Allwood.
- *No. 251. 'Oceanic,' sent by Messrs. Allwood.

Highly Commended.

- Nos. 5, 6. 'White Enchantress,' sent by Messrs. Engelmann, Allwood.
- No. 10. 'White Pearl,' sent by Messrs. Stuart Low.
- No. 28. 'Sunstar,' sent by Mr. Engelmann.
- Nos. 29, 247. 'Jessie Allwood,' sent by Messrs. Engelmann, Allwood.
- No. 38. 'May Day,' sent by Mr. Engelmann.
- Nos. 79, 80. 'Delice,' sent by Messrs. Engelmann, Allwood.
- No. 88. 'Lady Northcliffe,' sent by Mr. Engelmann.
- No. 99. 'Nora West,' sent by Mr. Engelmann.
- No. 106. 'Elsenham Beauty,' sent by Mr. Engelmann.
- No. 138. 'Elspeth,' sent by Mr. W. F. Hamilton.
- No. 149. 'West Hall Scarlet,' sent by Mr. G. Carpenter.
- Nos. 171, 172. 'Bishton Wonder,' sent by Messrs. Allwood, Engelmann.
- Nos. 174, 175. 'Mikado,' sent by Messrs. Engelmann, Allwood.
- Nos. 184, 185. 'Wivelsfield Claret,' sent by Messrs. Allwood, Engelmann.
- Nos. 194, 195. 'Countess of Wilton,' sent by Messrs. Engelmann, S. Low.
- Nos. 200, 201. 'Wivelsfield Wonder,' sent by Messrs. Allwood, Engelmann.
- Nos. 205, 206. 'Benora,' sent by Messrs. Allwood, Engelmann.
- Nos. 211, 212. 'Wivelsfield Beauty,' sent by Messrs. Allwood, Engelmann.
- No. 215. 'Harlequin,' sent by Mr. Engelmann.
- No. 218. 'Fanny,' sent by Mr. Engelmann.
- No. 223. 'Fancy Carola,' sent by Mr. Engelmann.
- No. 234. 'Claremont,' sent by Mr. F. A. Jones.
- No. 236. 'Iona,' sent by Mr. Engelmann.
- *No. 252. 'Gigantic,' sent by Messrs. Allwood.

Commended.

- No. 12. 'Whiteall,' sent by Mr. F. A. Jones.
- No. 17. 'White Benora,' sent by Messrs. Allwood.
- Nos. 21, 22. 'Maine Sunshine,' sent by Messrs. Allwood, Engelmann.
- No. 23. 'Yellow Stone,' sent by Mr. Engelmann.
- No. 31. 'Enchantress,' sent by Mr. Engelmann.
- No. 53. 'Winsor,' sent by Mr. Engelmann.
- Nos. 62, 63. 'Laddie,' sent by Messrs. Engelmann, Allwood.
- No. 84. 'Cupid,' sent by Mr. Engelmann.
- Nos. 90, 91. 'Mrs. T. Ives,' sent by Messrs. S. Low, Engelmann.
- No. 92. 'Queen Alexandra,' sent by Mr. Engelmann.
- Nos. 101, 102. 'Salmon King,' sent by Messrs. S. Low, Engelmann.
- Nos. 113, 114. 'Nikko,' sent by Messrs. Allwood, Engelmann.
- No. 115. 'Boadicea,' sent by Mr. Engelmann.
- No. 116. 'Peerless,' sent by Mr. Engelmann.
- Nos. 120, 121. 'Mary Allwood,' sent by Messrs. Allwood, Engelmann.
- No. 124. 'Malcolm,' sent by Mr. Engelmann.
- No. 126. 'Lens,' sent by Mr. G. Carpenter.
- No. 145. 'Nebraska,' sent by Mr. Engelmann.

* Perpetual-flowering Malmaison types.

- No. 151. 'Brilliant,' sent by Mr. Engelmann.
- No. 153. 'Mars,' sent by Mr. Engelmann.
- No. 163. 'Carola,' sent by Mr. Engelmann.
- No. 164. 'Pocahontas,' sent by Mr. Engelmann.
- No. 173. 'Czarina,' sent by Mr. Engelmann.
- No. 202. 'Dainty,' sent by Mr. F. A. Jones.
- No. 203. 'Speckles,' sent by Mr. Engelmann.
- No. 221. 'Toreador,' sent by Messrs. Allwood.
- Nos. 225, 226. 'Wivelsfield Apricot,' sent by Messrs. Engelmann, Allwood.
- Nos. 229, 230. 'Marion Willson,' sent by Messrs. Engelmann, Allwood.
- Nos. 238, 239. 'Circe,' sent by Messrs. S. Low, Engelmann.
- No. 242. 'Variegated Carola,' sent by Mr. Engelmann.

Other Exhibits.

- Messrs. Baker, Codswall : hardy plants.
- Messrs. Barr, Taplow : hardy plants.
- Mrs. Bartrum, Grange-over-Sands : seedling Primrose.
- Mrs. Botfield, Albrington : *Primula 'Breamish.'*
- Rt. Hon. Lord Brougham & Vaux, Cannes, France : Rose 'Follette.'
- Messrs. Bunyard, Maidstone : hardy plants.
- R. Butland, Esq., Paignton : seedling Aubrietias.
- G. T. B. Cobbett, Esq., Bishopsgate : Polyanthus.
- Messrs. J. & A. H. Crook, Beaconsfield : Polyanthus.
- Mr. E. Dixon, Putney : Polyanthus 'April Dixon.'
- Messrs. Gill, Falmouth : Rhododendrons and Anemones.
- Mr. R. W. Ivens, Harrietsham : Saxifrages.
- Messrs. Jarman, Chard : Pelargoniums and Violas.
- Messrs. Ladham, Southampton : hardy plants.
- Maytham Gardens, Rolvenden : hardy and half-hardy plants and Tulips.
- Messrs. Maxwell & Beale, Broadstone : alpines.
- Rev. B. Pinney, Durweston : Violets.
- Sir J. F. Ramsden, Bt., Gerrards Cross : Calla 'Byram Giant' and plant for naming from Kenya Colony.
- R.H.S. Gardens, Wisley : *Rhododendron Thomsonii.*
- L. de Rothschild, Esq., Exbury : *Rhododendron Delavayi.*
- H. S. Stewart, Esq., Malvern : Primula.
- Messrs. Watkins & Simpson, London : *Primula malacoides* hybrids.
- Messrs. R. Cornelius Wheeler, Aldersey : hardy plants.
- Mr. G. G. Whitelegg, Chislehurst : hardy plants.

FLORAL COMMITTEE, APRIL 24, 1923.

Mr. H. B. MAY, V.M.II., in the Chair, and thirty members present.

Awards Recommended :—

Silver-gilt Flora Medal.

- To Lady Aberconway and the Hon. H. D. McLaren, Bodnant, for Rhododendrons.
- To L. de Rothschild, Esq., Exbury, for Rhododendrons.

Silver-gilt Banksian Medal.

- To Messrs. Allwood, Haywards Heath, for Carnations.
- To Mr. J. Douglas, Great Bookham, for Auriculas.
- To Messrs. Gill, Falmouth, for Rhododendrons and Anemones.
- To Lieut.-Col. Messel, Handcross, for Rhododendrons, etc.
- To Colonel Stephenson Clarke, Cuckfield, for Rhododendrons.

Silver Flora Medal.

- To Messrs. Cheal, Crawley, for shrubs and hardy plants.
- To Messrs. Cutbush, Barnet, for Roses.
- To E. J. P. Magor, Esq., St. Tudy, for Rhododendrons.
- To Mr. G. W. Miller, Wisbech, for hardy plants.
- To Messrs. Wallace, Tunbridge Wells, for Rhododendrons.

Silver Banksian Medal.

To Mr. J. D. Botterill, Colne Park, for Sweet Peas.
 To Messrs. Bunyard, Maidstone, for hardy plants.
 To Messrs. Cutbush, Barnet, for rock garden.
 To Messrs. C. Elliott, Stevenage, for alpines.
 To Mr. C. Engelmann, Saffron Walden, for Carnations.
 To Mr. E. J. Hicks, Twyford, for Roses.
 To Messrs. Ladham's, Southampton, for hardy plants.
 To Messrs. S. Low, Bush Hill Park, for Carnations and other greenhouse plants.
 To Messrs. Carter Page, London, for hardy plants.
 To Messrs. Paul, Waltham Cross, for Roses.
 To Messrs. Storrie & Storrie, Glencarse, for greenhouse plants.
 To Mr. W. Wells, jun., Merstham, for alpines.
 To Messrs. van Nes, Boskoop, for Rhododendrons.
 To Messrs. Piper, Langley, for shrubs and hardy plants.

Bronze Flora Medal.

To Messrs. B. R. Cant, Colchester, for Roses.
 To Messrs. Luxford, Harlow, for Carnations.
 To Messrs. Maxwell & Beale, Broadstone, for hardy plants.
 To Mr. R. C. Notcutt, Woodbridge, for hardy shrubs.
 To Messrs. Reamsbottom, Geashall, for Anemones.
 To Messrs. Waterer, Sons & Crisp, Twyford, for hardy plants and shrubs

Bronze Banksian Medal.

To Messrs. Baker, Wolverhampton, for hardy plants.
 To Maytham Gardens, Rolvenden, for hardy plants.

Award of Merit.

To *Anemone St. Brigid*, ' Crowley's White' (votes 13 for, 6 against), from S. Crowley, Esq., Tipperary. A good white form of the St. Brigid Anemone, with large semi-double flowers of nice shape.

To *Cerasus 'Hukon'* (votes 22 for), from Mr. R. C. Notcutt, Woodbridge. A very free flowering tree bearing white flowers tinted with buff. The colour of the flowers is somewhat similar to the slightly yellow hue found in those of *Prunus serrulata 'luteo plena.'* The young foliage is purplish.

To *Clematis macropetala* (votes unanimous), from Messrs. Ingwersen & Jones, Stevenage. A handsome, pale-blue flowered hardy climber introduced from China by the late Mr. Reginald Farrer. The stems and flower stalks are very wiry, while the foliage is small and the double flowers are of fair size and very pretty. The plant belongs to the Atragene section and was first distributed as *Atragene sp.* F. 315.

To *Rhododendron bullatum 'Farrer's variety'* (votes 18 for), from T. H. Lowinsky, Esq., Sunninghill. Another of the late Mr. Reginald Farrer's introductions, being his *Rhododendron* No. F. 842. The plant appears to flower freely when quite young, and five large widely-open white flowers, measuring 4½ inches across, were borne on a plant less than a foot high. The handsome flowers have a slight trace of pale green at the base. The stems and the under-sides of the thick, leathery, crinkled, green leaves are covered with thick brown tomentum.

To *Rhododendron 'Euphrosyne'* (votes 13 for), from L. de Rothschild, Esq., Exbury. This beautiful seedling has very large bright carmine-pink flowers, spotted with small crimson dots. Each truss exhibited was composed of nearly a dozen flowers.

To *Rhododendron ficto-lacteum* (votes 19 for), from Mr. G. Reuthe, Keston. A beautiful species from China with trusses of twenty or more white flowers with very dark crimson blotches at the bases and also a few spots of the same colour. The dark green leaves are of large size, and the under-sides are covered with brown tomentum.

To *Rhododendron 'Gilian'* (votes 9 for, 4 against), from E. J. P. Magor, Esq., St. Tudy. A beautiful hybrid raised between *R. campylocarpum* and *R. Aucklandii*. Its large, handsome, campanulate flowers are of a very striking cardinal-red colour.

To *Rhododendron 'Penjerrick'* (votes 14 for, 2 against), from Lady Aberconway and the Hon. H. D. McLaren, Bodnant. This handsome variety has large pale-pink campanulate flowers borne in trusses of about nine. The

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pedicels are of a reddish colour and add to the attractiveness of the plant, which is another result of a cross between *R. campylocarpum* and *R. Aucklandii*.

To *Trillium undulatum* (votes 14 for), from Messrs. Waterer, Sons & Crisp, Twyford. A very pretty dwarf 'Wood Lily,' not more than four inches high. Its white flowers have a crimson zone round the centre and the attractive foliage is bronze tinted.

Other Exhibits.

Chalk Hill Nurseries, Reading : hardy plants.
Messrs. Chaplin, Waltham Cross : Roses.
Messrs. Crook, Beaconsfield : Polyanthus.
Messrs. Hill, Eastbourne : Aubrietias.
Messrs. Hillier, Winchester : shrubs.
Misses Hopkins, Shepperton : hardy plants.
G. W. E. Loder, Esq., Ardingly : Rhododendrons.
S. Morris, Esq., Norwich : *Pyrus Malus earlhamiensis*.
Messrs. L. R. Russell, Richmond : Rhododendrons.
Mr. W. Sellens, Woking : Polyanthus.
Messrs. Tucker, Oxford : alpines.
Mr. Yandell, Maidenhead : Violas.

FLORAL COMMITTEE, MAY 8, 1923.

Mr. H. B. May, V.M.H., in the Chair, and twenty-five members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To T. H. Lowinsky, Esq., Sunninghill, for Rhododendrons.

Silver-gilt Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

Silver Flora Medal.

To Messrs. Cuthbert, Southgate, for hardy shrubs.
To Messrs. Gill, Falmouth, for Rhododendrons.
To Mr. H. J. Jones, Lewisham, for Hydrangeas.
To Messrs. Prichard, Christchurch, for hardy plants.
To Messrs. Rogers, Southampton, for hardy plants.
To Messrs. S. Low, Bush Hill Park, for Carnations and other greenhouse plants.

Silver Banksian Medal.

To Messrs. Carter Page, London, for rock garden, Dahlias, and Violas.
To Messrs. Cheal, Crawley, for shrubs, alpines, and Dahlias.
To Messrs. Cutbush, Barnet, for rock garden.
To Mr. C. Engelmann, Saffron Walden, for Carnations.
To Mr. E. J. Hicks, Twyford, for Roses.
To Messrs. Ladham's, Southampton, for hardy plants.
To Mr. R. C. Notcutt, Woodbridge, for flowering shrubs.
To Orpington Nurseries, Orpington, for Irises.
To Messrs. Peed, West Norwood, for *Streptocarpus*, etc.
To Mr. A. Perry, Enfield, for hardy plants.
To Messrs. Piper, Langley, for hardy plants.
To Mr. G. Prince, Longworth, for Roses.
To Mr. G. Reuthe, Keston, for hardy plants and Rhododendrons (2 medals).
To Messrs. Russell, Richmond, for flowering shrubs, Amaryllis, etc.
To Messrs. Wallace, Tunbridge Wells, for shrubs.
To Messrs. Waterer, Sons & Crisp, Twyford, for hardy plants.
To Mr. F. G. Wood, Ashtead, for hardy plants.

Bronze Flora Medal.

To Messrs. Baker, Wolverhampton, for hardy plants.
To Messrs. F. Cant, Colchester, for Roses.
To Chalk Hill Nurseries, Reading, for hardy plants.
To Donard Nursery Co., Newcastle, for flowering shrubs.
To Messrs. C. Elliott, Stevenage, for alpines.

To Messrs. Maxwell & Beale, Broadstone, for alpines.
 To Maytham Gardens, Rolvenden, for flowering plants.
 To Messrs. Reamsbottom, Geashill, for Anemones.
 To Mr. W. Wells, jun., Merstham, for hardy plants.

Award of Merit.

To *Cytisus 'Cornish Cream'* (votes 17 for, 1 against), from Mr. R. C. Notcutt, Woodbridge. A very beautiful *Cytisus* raised by Mr. P. D. Williams. It bears great quantities of small compact creamy-white flowers.

To *Cytisus 'Dorothy Walpole'* (votes unanimous), from Messrs. Watson, Killiney, Co. Dublin. A seedling from *C. Dallimorei* raised in the garden of Mr. Walpole, Mount Usher, Co. Wicklow. The original plant is over six feet high. The flowers, which are borne with very great freedom, are large and of a pretty dull-red colour, which forms a striking contrast to the rich maroon of the keel.

To *Hydrangea 'Marechal Foch'* (votes 14 for, 5 against), from Mr. H. J. Jones, Lewisham. A very handsome and free-flowering variety, having the flowers pink and pale blue.

To *Iris Douglasiana 'Merton'* (votes 7 for, 1 against), from W. R. Dykes, Esq., Merton. A good variety of this species, having the prevailing colour of the flowers pale blue, becoming deep violet towards the middle of the falls, which are also marked with white and pale yellow.

To *Iris tenax purpurea* (votes 18 for), from W. R. Dykes, Esq., Merton. A very pretty variety of a reddish-purple colour, becoming deeper towards the end of the falls, which have a white marking in the middle and a gold crest.

To *Rhododendron decorum 'Mrs. Messel'* (votes 11 for, 1 against), from Lieut.-Col. Messel, Handcross. A very fine variety with broad open flowers of pure white borne in handsome trusses of about a dozen.

To *Rhododendron Sargentianum* (votes 13 for), from Lady Aberconway and Hon. H. D. McLaren, Bodnant. A pretty, dwarf, hardy Chinese species, which makes a good plant for the rock garden. It has pale yellow flowers about $\frac{1}{2}$ inch in diameter, and its dark green, almost Box-like leaves are shiny above and covered with brown tomentum below.

To Rose 'David Lloyd George' (votes 17 for, 2 against), from Mr. E. J. Hicks, Hurst. A new seedling, pale-pink Hybrid Tea variety of very large size and fine form.

To *Viola hybrida 'Haslemere'* (votes 14 for, 6 against), from Messrs. Thompson & Morgan, Ipswich. A very neat and compact variety, less than a foot high, bearing attractive pale-lilac flowers with a small golden centre prettily rayed.

Other Exhibits.

R. W. Ascroft, Esq., Effingham: *Myosotis 'Effingham Blue'* and '*White Beaver*'.

A. C. Bartholomew, Esq., Reading: *Anacyclus formosus* and *Polemonium carneum*.

Capt. Brassey, Northampton: Carnation 'Cottesbrooke White.'

Misses Hopkins, Shepperton: rock garden.

Messrs. Jarman, Chard: Pelargoniums and Violas.

Mr. P. Ladds, Swanley: Pelargoniums.

A. W. Warner, Esq., Hornchurch: *Schizanthus 'Double-flowered hybrids.'*

Messrs. Watney, Bexley Heath: Pelargoniums.

FLORAL COMMITTEE, MAY 29, 1923.

AT CHELSEA.

Mr. H. B. MAY, V.M.H., in the Chair, and thirty-one members present.

Awards Recommended:—*Award of Merit.*

To *Begonia 'Lord Lambourne'* (votes unanimous), from Messrs. Blackmore & Langdon, Bath. A large double orange variety of excellent form.

To *Campanula calcicola* (votes 18 for), from Mr. A. K. Bulley, Neston. A very pretty dwarf species discovered by Mr. F. Kingdon Ward. It grows about 6 inches high and has deep-blue bells somewhat like those of *C. rotundifolia* in

shape and size, but its chief interest lies in its small reniform leaves, which are very prettily marbled. It is quite hardy.

To Carnation 'Donald' (votes 18 for), from Mr. C. Engelmann, Saffron Walden. A deep-crimson perpetual flowering variety of good form and large size.

To Carnation 'Scarlet Iona' (votes 20 for, 1 against), from Mr. C. Engelmann, Saffron Walden. A large deep-scarlet perpetual-flowering variety of good form with very full flowers.

To Carnation 'Surprise' (votes 21 for), from Mr. C. Engelmann, Saffron Walden. An excellent pink perpetual-flowering variety of large size.

To *Gentiana Hopei* (votes 11 for, 1 against), from Messrs. Bees, Chester. An erect growing Gentian with deep-blue flowers each about 1 inch long with a much lighter interior. The leaves are from 1 to 2 inches long and dark-green in colour.

To *Hydrangea 'Triumph'* (votes unanimous), from Mr. H. J. Jones, Lewisham. A bright pink variety of excellent free-flowering habit.

To *Incarvillea 'Bees Pink'* (votes 19 for), from Messrs. Bees, Chester. A hardy variety raised by the exhibitors and having large pale-pink flowers similar in form to those of *I. Delavayi*.

To Lupines 'Downer's Strain' (votes unanimous), from Mr. G. R. Downer, Chichester. A very fine vigorous strain with a wide range of excellent colours comprising shades of purple, pale- and deep-pink, pale- and dark-violet blue, etc.

To *Primula chrysopsis* (votes unanimous), from Mr. A. K. Bulley, Neston. A hardy Primula collected by Mr. Geo. Forrest. It grows from 1½ to 2 feet high and carries its flowers freely in whorls. The individual flowers are about 1 inch across and of a deep lilac-mauve colour with a lighter zone round a golden eye.

To Rhododendron 'Lady Constance' (votes 23 for), from A. G. Soames, Esq., Uckfield. A very beautiful seedling of unknown parentage, producing large trusses of medium-sized deep-rose flowers.

To Rhododendron 'Pink Shell' (votes 10 for), from T. H. Lowinsky, Esq., Sunninghill. A seedling raised as the result of a cross between *R. Aucklandii rosea superba* and *R. 'H. M. Arderne.'* It has wide-open flowers of a beautiful pale-pink colour.

To Rhododendron 'Snow White' (votes 12 for), from T. H. Lowinsky, Esq., Sunninghill. A seedling resulting from a cross between *R. Aucklandii rosea superba* and *R. Fortunei.* It has very large wide-open pure white flowers.

To Rose 'Capt. F. S. Harvey-Cant' (votes 10 for, 1 against), from Messrs. F. Cant, Colchester. A deep-rose Hybrid Tea variety of large size and good form.

To Rose 'Chastity' (votes unanimous), from Messrs. F. Cant, Colchester. A climbing Hybrid Tea producing medium-sized pure white flowers.

To Rose 'Orange King' (votes unanimous), from Messrs. Cutbush, Barnet. A very striking dwarf Polyantha variety with small double orange flowers.

Cultural Commendation.

To Lady Aberconway and the Hon. H. D. McLaren, Bodnant, for *Androsace foliosa*. The specimen exhibited bore nine large and two small heads of bloom.

Other Exhibits.

Mr. J. C. Allgrove, Slough : *Eremurus Elwesianus magnificus*.

Blakeney Nurseries, Nottingham : P. F. Carnation 'Lord Tony.'

Mr. T. Carlile, Twyford : *Lupinus 'Light of Loddon.'*

Messrs. Cuthbert, Southgate : Azaleas.

Donald Nursery Co., Newcastle, Ireland : *Pernettya 'Bell's Seedling.'*

Mr. J. Douglas, Great Bookham : Border and Malmaison Carnations.

Mr. H. M. Elford, Bournemouth : *Geranium 'Silver King.'*

Messrs. Fletcher, Ottershaw : shrubs.

Messrs. Gibson, Bedale : Lupines and *Trollius*.

Dame Alice Godman, Horsham : *Ceanothus velutinus* and *Syringa deflexa*.

Messrs. Groom, Gosport : Border Carnation 'Mrs. G. R. Groom.'

Messrs. Hillier, Winchester : *Sedum paeatum*.

Messrs. Ireland & Hitchcock, Marks Tey : *Dianthus 'Mascotts.'* A.M. 1922.

Messrs. Jackman, Woking : Clematis 'The Bride.'

Messrs. Koster, Boskoop, Holland : Rhododendrons and Roses.

Messrs. S. Low, Enfield : *Aucuba japonica crotonaeifolia*.

Messrs. Piper, Langley : Rose 'Papa Gouchault.'

Messrs. R. Prichard, West Moors : Alpines.

Messrs. Rogers, Southampton : *Cupressus obtusa tetragona forma minima*.

Baron Schröder, Englefield Green : Calceolarias and Schizanthus.

Col. Stephenson Clarke, C.B., Cuckfield : Deutzia for naming (sent to Kew).

F. C. Stern, Esq., Goring-by-Sea : *Sempervivum Siliari*.
 Messrs. Thompson & Morgan, Ipswich : *Dianthus neglectus versicolor*.
 Messrs. Tucker, Oxford : *Verbascums*.
 Messrs. Waterer, Sons & Crisp, Twyford : *Lupine 'Dresden China'*.
 Yokohama Nursery Co., Kingsway : *Lilium longiflorum sinensis*.

FLORAL COMMITTEE, JUNE 12, 1923.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-nine members present.

Awards Recommended :—*Silver-gilt Flora Medal.*

To Messrs. Carter, Raynes Park, for flowering plants.
 To Messrs. A. Dickson, Belfast, for Sweet Peas.
 To Messrs. Sutton, Reading, for Sweet Peas, etc.

Silver-gilt Banksian Medal.

To Sir Everard Hambro, Hayes, for Saxifrages.
 To Messrs. Ireland & Hitchcock, Marks Tey, for Sweet Peas.

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
 To Messrs. Cheal, Crawley, for hardy plants, shrubs and Dahlias.
 To Mr. H. J. Jones, Lewisham, for Hydrangeas.
 To Messrs. Kelway, Langport, for Paeonies, Delphiniums, etc.
 To Orpington Nursery, Orpington, for Irises.
 To Mr. A. Perry, Enfield, for Irises.
 To Messrs. Wallace, Tunbridge Wells, for Irises.

Silver Banksian Medal.

To Messrs. Barr, Taplow, for hardy plants.
 To Messrs. Bunyard, Maidstone, for Irises.
 To Messrs. C. Elliott, Stevenage, for Lupines.
 To Messrs. Cutbush, Earnet, for Roses.
 To Mr. H. J. Damerum, Hayling Island, for Sweet Peas.
 To Mr. G. R. Downer, Chichester, for Lupines.
 To Mr. C. Engelmann, Saffron Walden, for Carnations.
 To Mr. F. Gifford, Hornchurch, for Paeonies.
 To Messrs. S. Low, Enfield, for Carnations and flowering shrubs.
 To Messrs. Ladham, Southampton, for hardy plants.
 To Messrs. Carter Page, London Wall, for hardy plants and Dahlias.
 To Rev. J. H. Pemberton, Romford, for Roses.
 To Messrs. Prichard, Christchurch, for hardy plants.
 To Mr. G. Reuthe, Keston, for hardy plants.
 To Mr. S. Smith, Enfield, for Cacti.
 To Capt. B. H. B. Symons-Jeune, London, for Saxifrages.
 To Messrs. Waterer, Sons & Crisp, Twyford, for hardy plants.

Bronze Flora Medal.

To Messrs. Rogers, Southampton, for hardy plants.
 To Mr. Scaplehorn, Beckenham, for hardy plants.

Bronze Banksian Medal.

To Messrs. Tucker, Oxford, for hardy plants.

Award of Merit.

To Iris 'Thundercloud' (votes 23 for), from the Orpington Nursery Co., Orpington. A very fine, large-flowered, bearded Iris raised by W. R. Dykes, Esq. Its bold flowers, which are borne on spikes over 3 feet high, are deep purplish-blue.

To *Lupinus arboreus* 'Light of Loddon' (votes unanimous), from Mr. T. Carlile, Twyford. A very good variety of the tree Lupine with deep-yellow, sweetly-scented flowers borne in great abundance.

To *Penstemon pinnatus* (votes 21 for), from C. T. Musgrave, Esq., Godalming. A tender border plant producing scarlet flowers about 1 inch long with wide-spreading, rounded lobes. The short ovate leaves are very glaucous.

To Pyrethrum 'Harold Robinson' (votes 18 for), from Mr. H. Robinson, Hinckley. A good seedling variety raised by the exhibitor. The flowers are large, single, and of a rich crimson colour with a golden centre.

To Rhododendron *dichroanthum* (votes 12 for), from Lady Aberconway and the Hon. H. D. McLaren, Bodnant. A hardy species from China. The tubular flowers are of a brick-red colour and borne in loose clusters. The ovate, lanceolate leaves are grey on the undersides.

To Rhododendron *insigne* (votes 12 for, 2 against), from Lady Aberconway and the Hon. H. D. McLaren, Bodnant. Another hardy Chinese species which is said to make a low free-flowering bush. Its beautiful pink campanulate flowers are borne in neat trusses.

To Rose 'Orange Queen' (votes 13 for, 3 against), from Messrs. Kersbergen Bros., Boskoop, Holland. A very free flowering Polyantha variety with very pretty double orange-salmon flowers.

To *Saxifraga Cotyledon* × *caterhamensis* (votes 15 for, 3 against), from Messrs. Ingwersen & Jones, Stevenage. A very attractive hybrid producing graceful pyramidal spikes of blush-white flowers the petals of which are freely spotted with crimson.

To Yucca *gloriosa argentea* (votes 10 for, 3 against), from Messrs. Smith, Guernsey. A very effective variety with deep green leaves having a central zone of greenish-white.

Cultural Commendation.

To Capt. B. H. B. Symons-Jeune, F.L.S., London, for *Saxifraga* 'Tumbling Waters,' A.M., 1920.

Other Exhibits.

Messrs. Baker, Wolverhampton : *Aster subcoeruleus* 'Peggy' and 'Kitty.'

A. C. Bartholomew, Esq., Reading : *Iris Watsoniana*, *I. cretensis*, *Allium albopilosum*, *Papaver trimaculatum*, *Iris Douglasiana*, *Clematis Fremontii superba*.

Mr. S. W. Burgess, Tonbridge : Rose 'Mrs. J. B. Mirrlees.'

Central Garden Supplies, Kenton : Violas.

Col. Stephenson Clarke, Cuckfield : plant for naming.

Messrs. Dobbie, Edinburgh : Aquilegias and Foxglove 'Marshall's White.'

Mr. W. F. Gullick, Salisbury : Pyrethrum 'White Queen Mary.'

Mr. C. W. Hollingsbee, Selling : seedling Carnation.

Misses Hopkins, Shepperton : hardy plants.

Mr. H. Lee, Bradmore : Pyrethrum 'Mrs. Harold Lee.'

Mrs. Raikes, Bergh Apton : seedling Pelargonium.

Mr. W. Wells, jun., Merstham : hardy plants.

Mr. J. W. Wilkinson, Wellington : Pyrethums.

W. Van de Weyer, Esq., Corfe Castle : *Buddleia globosa hybrida*.

FLORAL COMMITTEE, JUNE 26, 1923.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-four members present.

Awards Recommended :—

Gold Medal.

To Messrs. Sutton, Reading, for Sweet Peas.

Silver-gilt Flora Medal.

To Messrs. Dobbie, Edinburgh, for Sweet Peas.

Silver-gilt Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Blackmore & Langdon, Bath, for Delphiniums.

To Hon. Vicary Gibbs, Elstree, for Streptocarpus.

To Mr. A. Perry, Enfield, for Irises.

To Baron Schroder, Englefield Green, for greenhouse plants.

Silver Flora Medal.

To Messrs. Bath, Wisbech, for hardy plants.

To Mr. T. Carlile, Twyford, for Delphiniums.

To Mr. J. Douglas, Great Bookham, for border Carnations.

To Messrs. Ladham's, Southampton, for hardy plants.

To Messrs. Prichard, Christchurch, for hardy plants.
 To Messrs. Russell, Richmond, for stove plants.
 To Messrs. Waterer, Sons & Crisp, Twyford, for hardy plants.

Silver Banksian Medal.

To Messrs. Barr, Taplow, for hardy plants.
 To Messrs. Bolton, Halstead, for Sweet Peas.
 To Messrs. F. Cant, Colchester, for Roses.
 To Messrs. Carter Page, London, for hardy plants.
 To Messrs. Cutbush, Barnet, for Carnations.
 To Donald Nursery, Newcastle, for shrubs.
 To Mr. C. Engelmann, Saffron Walden, for Carnations.
 To Messrs. Godfrey, Exmouth, for hardy plants.
 To Messrs. Harkness, Bedale, for Lupines.
 To Messrs. Kelway, Langport, for Peonies and Delphiniums.
 To Messrs. J. K. King, Coggeshall, for Sweet Peas.
 To Messrs. Lowe & Gibson, Crawley Down, for Gladioli, Irises and Pinks.
 To Messrs. Piper, Langley, for shrubs.
 To Mr. G. Routte, Keston, for hardy plants.
 To Mr. Scaplehorn, Beckenham, for hardy plants.
 To Mr. S. Smith, Enfield, for Cacti, etc.
 To Messrs. Tucker, Oxford, for hardy plants.
 To Messrs. Wallace, Tunbridge Wells, for Lilies and Irises.
 To Mr. W. Wells, jun., Mersham, for Delphiniums, etc.
 To Mr. F. G. Wood, Ashtead, for hardy plants.

Bronze Flora Medal.

To Messrs. Baker, Wolverhampton, for hardy plants.
 To Messrs. Carter, Raynes Park, for Iceland Poppies.
 To Central Gard'n Supplies, Kenton, for Violas.
 To Chalk Hill Nurseries, Reading, for hardy plants.
 To Misses Hopkins, Shepperton, for hardy plants.

Bronze Banksian Medal.

To Messrs. Skelton & Kirby, Pirbright, for Delphiniums and Dianthus.

Award of Merit.

To *Campanula persicifolia gigantea coronata 'The King'* (votes 8 for, 3 against), from Messrs. Ladham's, Southampton. The deep-blue, widely expanded flowers of this variety are of the 'cup and saucer' type.

To *Delphinium 'Blue Boy'* (votes 17 for, 1 against), from Messrs. Blackmore & Langdon, Bath. A rich sky-blue single variety with a white eye.

To *Delphinium 'Mrs. Townley Parker'* (votes 14 for), from Messrs. Blackmore & Langdon, Bath. The pale-blue, white-eyed flowers of this variety are of large size and set closely together on the spike, which is of branching habit.

To *Delphinium 'Unique'* (votes 8 for, 3 against), from Mr. T. Carlile, Twyford. The semi-double flowers of this variety are of a deep-blue colour with a dark eye.

To *Kolkwitzia amabilis* (votes 8 for, 1 against), from Lt.-Col. Messel, O.B.E., Handcross. A very pretty hardy flowering shrub from Hupeh, China. Its flowers which are borne in great numbers are pink and shaped like those of *Diervilla*, but smaller. They are pink with a little orange colouring in the throat. The small ovate leaves are hairy beneath.

To *Lilium x 'Golden Orb'* (votes 5 for), from Messrs. Wallace, Tunbridge Wells. This beautiful hybrid, belonging to the *Hansoni* group, was raised by Mrs. Backhouse. The flowers are light-yellow freely spotted with maroon. They measure about 3 inches across and the segments recurve with age.

To *Lupine 'Harkness Strain'* (votes 14 for), from Messrs. Harkness, Bedale. A good strain, remarkable chiefly on account of its wide range of distinct colours, comprising various shades of amber, rose, pink, salmon and yellow.

To *Papaver orientale 'Ethel Swete'* (votes 9 for), from Messrs. Harkness, Bedale; Messrs. Gibson, Leeming Bar; and Messrs. Barr, Taplow. A cerise-pink variety of beautiful form with a black blotch at the base of each petal. It is said to be the result of a cross between *P. orientale 'Mrs. Harkness'* and *P. orientale 'Perry's White.'*

To *Papaver orientale 'Mrs. H. G. Stobart'* (votes 19 for), from Messrs. Harkness, Bedale; Messrs. Gibson, Leeming Bar; and Messrs. Barr, Taplow. A large-flowered bright cerise variety tinted with rose and having black blotches at the

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base of the petals. The margins are slightly fringed and the parentage of this variety is reported to be the same as that of the one mentioned above.

Cultural Commendation.

To Hon. Vicary Gibbs, V.M.H. (gr. Mr. E. Beckett, V.M.H.), Elstree, for strain of *Streptocarpus*.

Other Exhibits.

Messrs. Maxwell & Beale, Broadstone : hardy plants.

Maytham Gardens, Rolvenden : Lupine 'Maytham Sunrise.'

Mr. H. W. Mitchell, Wolverley : *Delphinium* 'Dr. Fraser.'

Mr. J. J. Norfolk, Knaresborough : *Pyrethrum* 'Mrs. J. J. Norfolk.'

Mr. J. H. Page, Surbiton : *Delphinium* 'Mrs. H. J. Page' and *Statice* 'John Page.'

R.H.S. Gardens, Wisley : *Salpiglossis*, *Armeria splendens*, a plant long in cultivation at Wisley. Useful in the border in early summer and flowering over a long period. Less virulent in colour than many forms. *Ceanothus* 'Wisley Blue,' a seedling raised at Wisley. Very floriferous—flowering from end of May through June. Apparently quite hardy. Growing in open border for the past six years.

Messrs. Searle, Whittlesey : Pink 'Norman Searle.'

Mr. C. Turner, Slough : Pinks.

Mr. J. Warrington, Windsor : seedling Viola.

The following awards recommended to *Salpiglossis* (under glass) on trial at Wisley were confirmed :—

Award of Merit.

Sup. *rbissima* *Aurea*, sent by Messrs. Barr.

Yellow, sent by Mr. Dawkins.

Yellow edged White, sent by Messrs. W. H. Simpson.

Chamois, sent by Messrs. Barr.

Chamois. Rose Carmine centre, sent by Messrs. W. H. Simpson.

Velvety-Red *Gloxinia*-flowered, sent by Messrs. W. H. Simpson.

Superbissima Light Blue, sent by Mr. Dawkins.

Violet d'Iris, sent by Messrs. W. H. Simpson.

Purple and Gold, sent by Messrs. Toogood.

Dwarf Large-flowered Mixed, sent by Messrs. W. H. Simpson.

Highly Commended.

Superbissima Yellow, sent by Mr. Dawkins.

Superbissima Chamois, sent by Mr. Dawkins.

Superbissima Dark Scarlet, sent by Mr. Dawkins.

Lilac veined Yellow, sent by Messrs. Barr.

Purple-Violet and Yellow, sent by Messrs. Barr.

Purple, sent by Mr. Dawkins.

Black, sent by Messrs. Barr.

ORCHID COMMITTEE.

JANUARY 16, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and fifteen members present.

Awards Recommended :—*Silver Flora Medal.*

To Messrs. Charlesworth, Haywards Heath, for hybrid Odontoglossums and Cattleyas.

To Messrs. Cowan, Southgate, for a group with six examples of *Laeliocattleya* × 'Dodona,' and white *L.-c.* × *Schroederae*.

To Messrs. Stuart Low, Jarvisbrook, for hybrids.

To Messrs. Sanders, St. Albans, for hybrids and rare species.

Silver Banksian Medal.

To Messrs. McBean, Cooksbridge, for good specimens of *Cymbidium* and *Odontoglossum*.

Award of Merit.

To *Brassocattleya* × 'British Queen' (*B.-c.* × *Digbyano-Mendelii* × *C. × 'Lord Rothschild'*) (votes 13 for), from Pantia Ralli, Esq., Ashtead Park. Flower large, rosy-mauve with purple front to the lip.

To *Sophronitis Lowii* (votes unanimous), from Pantia Ralli, Esq. A dwarf plant with a profusion of bright yellow flowers.

To *Cymbidium* × 'Curlew' var. 'Feather' ('Butterfly' × *Alexanderi*) (votes 8 for, 4 against), from Lt.-Col. Sir Geo. L. Holford, K.C.V.O. A white variety with feathered faint purple lines and crimson blotches on the lip.

To *Cymbidium* × 'Doreen' (*Pauwelsii* × *Doris*) (votes unanimous), from Messrs. McBean, Cooksbridge. A large dark variety with heavy dotted lines of dark claret colour with slight gold markings and margin.

Other Exhibits.

Sir Jeremiah Colman, Bt.: *Odontioda* × 'Brackenhurst,' Gatton Park var., and *Dendrobiums*.

R. Gerrish, Esq., Salisbury: *Odontoglossum crispum*, Gerrish's var.

Pantia Kalli, Esq.: *Cattleya Trianae* var. 'Col. H. Carlisle.'

A. M. Gentle, Esq., St. Albans: hybrid *Cypripediums*.

G. W. Bird, Esq., West Wickham: *Odontioda* × 'Rufus.'

ORCHID COMMITTEE, JANUARY 30, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and sixteen members present.

Awards Recommended :—*First-class Certificate.*

To *Cypripedium* × 'Dulcis,' Lambeau's var. (*Curtmannii* × 'Alcibiades' *illustris*) (votes unanimous), from Monsieur Firmin Lambeau, Brussels. A very distinct Cypripedium with large white dorsal sepal with undulated margin, the lower half being mauve with darker lines. Petals and lip honey-yellow tinged with chocolate-purple.

Award of Merit.

To *Brassocattleya* × 'Hannibal' var. 'Helen' (*B.-c.* *Digbyano-Warneri* × *C. Fabia*) (votes 13 for), from G. W. Bird, Esq., Manor House, West Wickham. Flowers bright vinous purple with darker lips.

To *Odontoglossum* × 'Llewellyn' (*amabile* × 'Georgius Rex') (votes 14 for), from Messrs. Charlesworth & Co., Ltd., Haywards Heath. A finely formed flower with pale-yellow ground blotched on the inner parts of the segments with reddish-purple.

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Cultural Commendation.

To Messrs. Armstrong & Brown, Tunbridge Wells, for a finely flowered *Odontoglossum* x 'Strathmore.'

To Mr. S. Lyne (gr. to J. J. Bolton, Esq., Claygate), for a dark form of *Odontoglossum* x *ardentissimum* with twenty-two flowers.

Other Exhibits.

Baron Schröder: *Cypripedium* x 'Eurybiades, The Baron.'

H. T. Pitt, Esq.: hybrid Cypripediums.

J. J. Bolton, Esq.: Sophrolaeliocattleyas.

Messrs. Stuart Low: Sophronitis crosses.

Messrs. McBean: Brassocattleyas and other hybrids.

Messrs. Sanders: Cypripediums.

Messrs. Flory & Black: hybrids.

Messrs. Charlesworth: Odontoglossums and Miltonia hybrids.

Messrs. Armstrong & Brown: *Cymbidium* x 'Radiant' (*I'Ansoni Craventianum* x *erythrostylum*).

ORCHID COMMITTEE, FEBRUARY 13, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and nineteen members present.

Awards Recommended:—

Gold Medal.

To Messrs. Charlesworth, Haywards Heath, for a large and well-arranged group of hybrids.

Silver Flora Medal.

To Messrs. Cowan, Southgate, for Laeliocattleyas.

To Messrs. Cypher, Cheltenham, for rare Cypripediums.

To Messrs. McLean, Cooksbridge, for Cattleyas and Laeliocattleyas.

To Messrs. Sanders, St. Albans, for hybrids and species.

Silver Banksian Medal.

To J. J. Bolton, Esq., Claygate, for Odontoglossums and Dendrobiums.

First-class Certificate.

To *Odontonia* x 'Baroness Schröder' (*Miltonia* x *Bleuana* x *Odontoglossum* x 'The Czar') (votes unanimous), from Messrs. Charlesworth. A remarkably fine hybrid with flowers shaped like Miltonia. Sepals and petals purple with white margins. Lip white, heavily marked with ruby-red.

To *Dendrobium* x 'Gatton Monarch' var. 'F. J. Hanbury' ('Lady Colman' x *nobile nobilis*) (votes unanimous), from F. J. Hanbury, Esq., Brockhurst, East Grinstead. Flowers large and of fine form, white tinged with mauve, the lip having a dark maroon base.

Award of Merit.

To *Odontoglossum* x 'Purple Queen' (*percutum* x 'Dusky Monarch') (votes unanimous), from J. J. Bolton, Esq., Claygate. Sepals and petals mauve-purple. Lip marked with white in front.

Cultural Commendation.

To Mr. H. G. Alexander (gr. to Lt.-Col. Sir Geo. L. Holford, K.C.V.O.), for six finely grown plants of the pure white *Cattleya Percivaliana* var. 'Lady Holford,' the largest having six flowers.

Other Exhibits.

Sir Jeremiah Colman, Bt.: rare Dendrobiums.

Frederick J. Hanbury, Esq.: Dendrobiums.

Lt.-Col. Sir Geo. L. Holford: *Cymbidium*.

R. Gerrish, Esq.: Odontoglossum.

Pantia Ralli, Esq.: *Odontioda* x 'Rubicon.'

Messrs. Stuart Low: hybrids.

ORCHID COMMITTEE, FEBRUARY 27, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and twenty members present.

Awards Recommended :—*Gold Medal.*

To Messrs. McBean, Cooksbridge, for a large and well-arranged group. A cultural commendation was also awarded.

Silver gilt Flora Medal.

To H. T. Pitt, Esq., Rosslyn, Stamford Hill, for hybrids and rare species

Silver Flora Medal.

To Messrs. Cowan, Southgate, for finely flowered hybrids.

To Messrs. Stuart Low, Jarvisbrook, for Lachocattleyas and other hybrids.

To Messrs. Sanders, St. Albans, for Cymbidiums and Dendrobiums.

First-class Certificate.

To *Cymbidium × Alexanderi* var. 'Rosalind' (*insigne* × *eburneo-Lowianum*) (votes 13 for), from Lt. Col. Sir Geo. L. Holford, K.C.V.O., Westoubirt. The plant bore two spikes of twenty flowers blush-white with band of mauve spotting around the lip.

To *Cymbidium × 'Auriga'* (*Alexanderi aurantiacum* × 'Excelsior') (votes 15 for), from Messrs. McBean, Cooksbridge. The plant bore twenty-one large flowers of perfect shape, cream white tinged with primrose colour, and with a red band on the front of the lip.

Award of Merit.

To *Odontioda* × 'Colinge' var. 'Rosemary' (*Odm. crispum* × *Oda. × Coronation*) (votes unanimous), from J. J. Bolton, Esq., Claygate. Flowers like the Odontoglossum parent, but coloured deep claret-red with white front to the lip.

To *Odontioda* × 'Rufus' var. 'Wickham Beauty' (*Odm. crispum* × *Oda. × beechensis*) (votes unanimous) from G. W. Bird, Esq., the Manor House, West Wickham. Sepals and petals claret red on the inner halves of the segments, white on the outer parts.

To *Cypripedium* × 'Senator' ('Gladiator' × 'Lord Wolmer,' Blenheim var.) (votes 11 for, 3 against) from Messrs. Flory & Black, Slough. Dorsal sepal white, evenly spotted with claret-red; petals and lip yellow, tinged with chocolate brown.

Other Exhibits.

Pantia Ralli, Esq.: *Brassocattleya* × 'Albion' (*C. Trianae alba* × *B.-c. Thorntoni alba*). Flowers white.

Baron Bruno Schroder: fine sprays of *Cymbidium* × *Pauwelsii*, the Dell variety.

Lt.-Col. Sir Geo. L. Holford, K.C.V.O.: *Cymbidium* × 'Martin,' and the yellow *Laeliocattleya* × 'Ilma.'

J. J. Bolton, Esq.: Odontoglossums and *Sophrolaeliocattleya* × .

Messrs. Flory & Black: hybrids.

ORCHID COMMITTEE, MARCH 13, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and seventeen members present.

Awards Recommended :—*Gold Medal.*

To Messrs. Sanders, St. Albans, for a very fine, varied and well-arranged group in which their distinct type of *Cymbidium insigne* was well represented.

Silver Flora Medal.

To H. T. Pitt, Esq., Stamford Hill, for group with three large specimens of the rare *Neo-Moorea irrorata*.

To Messrs. Stuart Low, Jarvisbrook, for brightly coloured hybrids.

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First-class Certificate.

To *Cymbidium* × 'Merlin,' Westonbirt var. ('Dryad' × *Alexanderi*) (votes unanimous), from Lt.-Col. Sir Geo. L. Holiford, K.C.V.O., Westonbirt. Flower of perfect shape, in colour Tea Rose blush, the front of the lip freckled and spotted with ruby-red.

To *Odontoglossum* × 'Llewellyn' (*amabile* × 'Georgius Rex') (votes 14 for), from H. T. Pitt, Esq., Stamford Hill. The plant received a Preliminary Commendation March 28, 1922. As now shown it had large ruby-claret flowers with white front to the lip.

Award of Merit.

To *Cymbidium insigne rhodochilum* (votes unanimous), from Messrs. Sanders, St. Albans. A remarkable form of the type *Sanderi*. Flowers large, blush-white with ruby-purple lip.

To *Cymbidium insigne* 'St. Andre' (votes 14 for), from Messrs. Sanders. Similar to the variety *rhodochilum* but with violet lip.

To *Odontonia* × 'Dora' (*Miltonia* × *Bleuana* × *Odm.* × 'Dora') (votes 14 for, 2 against), from Messrs. Charlesworth. Approaching *Miltonia* in form, the flowers light rose, effectively marked with crimson.

Other Exhibits.

Lt.-Col. Sir Geo. L. Holiford, K.C.V.O.: *Cymbidium* × 'President Wilson' and 'Kittiwake,' Westonbirt var.

The Duke of Marlborough: *Brassocattleya* × 'Peace' and *Cypripedium* × 'Moonstar.'

Pantia Ralli, Esq.: *Brassocattleya* × 'Albion.'
Messrs. Charlesworth: *Odontonias*.

ORCHID COMMITTEE, MARCH 27, 1923.

C. J. LUCAS, Esq., in the Chair, and fifteen members present.

Awards Recommended:—

Silver Flora Medal.

To Messrs. Sanders, St. Albans, for Dendrobiums, Cymbidiums and Laeliocattleyas with rare species.

To Messrs. Cowan, Southgate, for Cymbidiums.

Silver Banksian Medal.

To Messrs. Flory & Black, Slough, for a group with many white Cattleyas.

Award of Merit.

To *Odontoglossum* × 'Aurora' var. 'Rajah' (*Rossii* × *Lambeanianum*) (votes 9 for, 1 against), from Messrs. Sanders. A distinct form with claret-red sepals and petals with broad white margins and pure white lip.

To *Laeliocattleya* × 'Nora' (*C.* × 'Nortia' × *L.c.* × *Dominiana*) (votes unanimous), from Messrs. Cowan, Southgate. Flowers large, rosy-mauve with broad claret-purple lip.

To *Cattleya* × *suavior*, Low's var. (*Mendelii* × *intermedia Aquinii*) (votes 9 for, 1 against). The type with normal parents was flowered by Messrs. Veitch in 1893. Low's variety had the peloric *C. intermedia Aquinii* (A.M. May 28, 1902) as one of the parents, and its broad petals with purple central band are inherited.

Other Exhibits.

Lady Aberconway: *Cypripedium* × 'Psyche,' Bodnant var.

General Sir Arthur Paget: *Cymbidium* × 'Lady R. Paget.'

Sir G. H. Kenrick: *Dendrobium* × 'Niobe.'

ORCHID COMMITTEE, APRIL 10, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and thirteen members present.

Awards Recommended:—

Silver Flora Medal.

To E. R. Ashton, Esq., Broadlands, Tunbridge Wells, for hybrids and *Sophronitis grandiflora*.

First-class Certificate.

To *Miltoniodes Harwoodii*, Ashtead Park var. (*Miltonia vexillaria* × *Cochlioda Noerziana*) (votes unanimous), from Pantia Ralli, Esq., Ashtead Park. The plant bore a spike of fourteen flowers, magenta-crimson in colour.

To *Cattleya* × 'Dr. Miguel Lacroze' var. 'Excelsior' ('Octave Doin' × 'Tityus') (votes unanimous). Flowers over eight inches across, rosy-mauve with purplish-crimson lip having yellow lines at the base.

To *Laeliocattleya* × *Hassallii* var. 'Perfection' (*L.-c.* × '*Britannia*' *alba* × *C. Warszewiczii*, 'Frau M. Beyrodt') (votes unanimous). A very handsome form in which the large claret-red lip contrasts effectively with the pure white sepals and petals.

Award of Merit.

To *Odontoglossum* × 'Aglaon' *majesticum* (*eximium* × *Vuylstekeac*) (votes 11 for), from H. T. Pitt, Esq., Rosslyn, Stamford Hill. A large flower of fine substance, white, heavily marked with dark purple.

To *Laeliocattleya* × 'Faust' Broadlands var. (*luminosa* × *Ernestii*) (votes 8 for, 3 against), from E. R. Ashton, Esq. Flowers orange-yellow with maroon-crimson lip having a yellow disc.

To *Odontoglossum* × 'Aureola' (parentage unrecorded) (votes 10 for), from Pantia Ralli, Esq. Resembling the *O. lochristyense* form of *O. harvengtense*. Canary-yellow, sparsely marked with chocolate-red.

Other Exhibits.

Sir Geo. L. Holford, K.C.V.O.: *Laeliocattleya* × 'Orange Blossom' (F.C.C. April 5, 1921).

H. T. Pitt, Esq.: *Odontioda* × 'Zarina.'

Mr. Chas. Gray: *Brassocattleya* × .

ORCHID COMMITTEE, APRIL 24, 1923.

Sir JEREMIAH COLMAN, Bt. in the Chair, and seventeen members present.

*Awards Recommended:—**Silver Flora Medal.*

To H. T. Pitt, Esq., Rosslyn, Stamford Hill, for hybrids and rare species

Silver Banksian Medal.

To Messrs. Sanders, St. Albans, for a group with hybrid Miltonias.

To Messrs. Stuart Low, Jarvisbrook, for Orchids and Anthuriums.

Award of Merit.

To *Odontoglossum* × 'Fabia' var. 'Biddy' (*eximium* × 'Aglaon') (votes 14 for), from C. J. Lucas, Esq., Warnham Court. A fine hybrid with large flowers having a white ground heavily marked with claret-purple.

To *Brassocattleya* × 'Apollo' var. 'Majestica' (*B.-c.* × *Digbyano-Mossiae* × *C. Mendelii*) (votes 12 for), from Messrs. Cowan, Southgate. Flowers large, blush rose, the front of the lip purplish, disc yellow.

Cultural Commendation.

To Mr. James Penton (gr. to General Sir Arthur Paget), Warren House, Coombe Wood, for a grand specimen of *Cyrtopodium punctatum* with a much-branched inflorescence over four feet in height, and bearing numerous yellow flowers spotted with red.

Other Exhibits.

Lady Aberconway and the Hon. Henry McLaren: *Cypripedium* × 'Psyche,' Bodnant variety.

Dr. Miguel Lacroze: *Brassocattleya* × *Cliftonii magnifica*, and *Sophrolaeliocattleya* × 'Meuse' var. 'Bryndir.'

ORCHID COMMITTEE, MAY 8, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and eighteen members present.

*Awards Recommended:—**Silver Banksian Medal.*

To Messrs. Stuart Low, Jarvisbrook, for a group.

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First-class Certificate.

To *Odontioda* × 'Naomi' (*Oda.* × *Vuylstekaeae* × *Odm.* × 'Nathaniel') (votes 13 for), from R. Gerrish, Esq., Milford Manor, Salisbury. The plant bore a stout spike of fourteen large ruby-red flowers, with blush-white base to the lip.

Award of Merit.

To *Odontoglossum* × 'Tagus,' Gerrish's var. ('Othello' × 'Doris' *magnificum*) (votes unanimous), from R. Gerrish, Esq. Flowers large and of perfect shape, violet-purple with slight white markings. The spike bore four flowers.

To *Odontoglossum* × 'Gorizia' var. 'Imperial Purple' ('Jasper' × 'President Poincaré') (votes unanimous), from J. J. Bolton, Esq., Claygate. The plant bore a spike of six flowers, each four inches across, deep violet-purple with white margin, the petals being serrated on the upper edge.

Other Exhibits.

R. Gerrish, Esq.: *Odontoglossums*.

Pantia Ralli, Esq.: *Odontoglossum* × 'Imperial' ('Colossus' × *gandavense*).

Messrs. Flory & Black: hybrid *Cattleyas*.

Messrs. Cowan: *Cattleya* × 'Tityus,' Duchess of York.

ORCHID COMMITTEE, CHELSEA, MAY 29, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and twenty-one members present.

Awards Recommen'd:—

First-class Certificate.

To *Dendrobium* × 'Gatton Sunray' (*Dalhousianum luteum* × *illustre*) (votes unanimous), from Sir Jeremiah Colman, Bt., Gatton Park. The plant bore three spikes of many clear yellow flowers with maroon blotch on the lip.

To *Cypripedium* × *Fletcherianum* var. 'Antinea' (*Godeffroyae leucochilum* × 'W. R. Lee' var. 'Lord Derby') (votes unanimous), from Messrs. Cowan, Southgate. A form of the type which gained the A.M. September 25, 1906. Flowers yellowish cream colour with claret markings.

To *Cattleya* × 'Prince Shimadzu' var. 'Olympus' ('Tityus' × *Hardiana*) (votes unanimous), from Messrs. Flory & Black, Slough. Flower of the largest of the *C. labiata* group, rosy-mauve with a gold shade, and broad ruby-purple lip.

To *Odontoglossum* × *crispo-Solon* var. 'Carmania' (*crispum* × 'Solon') (votes unanimous), from Messrs. McBean. Flower large, violet-purple with white margin and front to the lip.

To *Odontioda* × 'Radiant' var. 'Majestic' ('Chantecler' × 'Royal Gem') (votes 8 for, 3 against), from Messrs. McBean. The plant bore a spike of twelve dark scarlet flowers with white front to the lip.

To *Brassolaeliocattleya* × *Truffautiana* var. 'Triumph' (B.-c. × 'Mrs. J. Leemann' × *L.-c. x luminosa*) (votes 8 for), from Messrs. Stuart Low, Jarvisbrook. Sepals and petals pale yellow, lip purple.

To *Odontioda* × 'Duchess of York' (parentage unrecorded) (votes unanimous), from Messrs. Charlesworth, Haywards Heath. A showy red flower with mauve shade and white markings.

To *Cattleya* × 'Irene' var. 'Our Queen' (*Mossiae Wageneri* × 'Suzanne Hye de Crom') (votes unanimous), from Messrs. Flory & Black. An improvement on the *C. Mossiae* parent. Flowers large, pure white with yellow disc to the lip.

To *Cymbidium* × 'Castor' var. 'Laburnum' (*instigne* × *Woodhamstanum*) (votes 13 for), from Pantia Ralli, Esq., Ashstead Park. Spike bearing fourteen primrose-yellow flowers with light red markings on the lip.

Award of Merit.

To *Odontioda* × 'Brilliant' ('Chantecler' × 'Joan') (votes unanimous), from Pantia Ralli, Esq. A fine bright scarlet flower of firm substance.

To *Odontoglossum* × 'Gatton Emperor' var. 'Nero' (*Lambeauianum* × unrecorded) (votes unanimous), from Sir Jeremiah Colman, Bt. Flower ruby-purple with slight white margin and front to the lip.

To *Miltonia* × 'Constance' (*wexillaria* 'Lyoth' × 'Isabel Sander') (votes 13 for), from Messrs. Charlesworth. A large white flower with pink veining and maroon mask to the lip.

To *Odontoglossum* × 'Llewellyn' var. 'Colossum' (*amabile* × 'Georgius Rex') (votes unanimous), from Messrs. Charlesworth. Flowers large, rosy-mauve with light markings.

To *Odontoglossum crispum* 'Esmeralda' (votes unanimous), from Messrs. McBean. A grand home-raised white form with two spikes of nineteen flowers.

To *Miltonia* × 'Butterfly' var. 'Empress' (parentage unrecorded) (votes 10 for, 2 against), from Messrs. Sanders. Flowers large, pure white with maroon disc to the lip.

To *Miltonia* × *Sanderae* 'Unique' ('St. André' × *vexillaria* 'G. D. Owen') (votes unanimous), from Messrs. Sanders. Flowers white with pink markings and dark mask on the lip.

To *Cattleya* × 'G. P. Walker' (*Mendelii* × 'Tityus') (votes 8 for, 1 against), from Messrs. Flory & Black. Flower tinged with mauve; front of lip dark crimson.

To *Brassocattleya* × 'Villa Jeanne' (*C.* × 'Empress Frederick' × *B.-c. Dietrichiana*) (votes unanimous), from Messrs. Stuart Low. A well-formed, rosy-mauve flower with purple front to the lip.

To *Odontoglossum* × 'Serapis' var. 'Dusky Monarch' (*eximium* × 'Dusky Monarch') (votes 8 for), from Messrs. Cowan. Flower heavily marked with violet on white ground.

To *Odontonia* × 'Olivia' (*M. Bleuana* × *Odm. triumphans*) (votes 12 for), from Messrs. Charlesworth. Features of the *Odontoglossum* parent. Flowers pale-yellow blotched with chestnut-red.

To *Odontioda* × 'Murillo' (*Oda.* × 'Chantecler' × *Odm.* × 'Aglaon') (votes 8 for), from Messrs. Cowan. Flower scarlet with slight white markings.

Cultural Commendation.

To Mr. Farnes, orchid grower to Pantia Ralli, Esq., for a large specimen of *Laeliocattleya* × 'Excelsior' var. 'The Globe.'

To Messrs. Armstrong & Brown, for a noble specimen of the Philippine *Dendrobium acuminatum* with five spikes.

Vote of Thanks.

To J. J. Bolton, Esq., Claygate, for cut flowers.

ORCHID COMMITTEE, JUNE 12, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and twelve members present.

Awards Recommended:—

Silver Flora Medal.

To Messrs. Sanders, St. Albans, for Dendrobiums and Miltonias.

To Messrs. Cowan, Soutngate, for Laeliocattleyas and Brassolaeliocattleyas.

To Messrs. Stuart Low, Jarvisbrook, for hybrids and rare species.

First-class Certificate.

To *Odontoglossum* × 'Goldcrest' (parentage unrecorded) (votes unanimous), from Messrs. Armstrong & Brown, Tunbridge Wells. The plant bore a spike of thirteen large white flowers blotched with chrome-yellow.

Award of Merit.

To *Miltonia* × 'William Pitt' ('Isabel Sander' × *Bleuana* 'Reine Elisabeth') (votes 8 for, 2 against). A seedling with the first flower, which was large and almost circular in outline. Sepals white, with basal violet markings; petals deep violet, with white tips; lip white in front, violet on the basal half; crest yellow.

To *Odontonia* × 'Corona' var. 'Rajah' (*Miltonia Warscewiczii* × *Odm. Harry-anum*) (votes 10 for), from Messrs. Charlesworth. The branched spike bore numerous flowers nearest to the Miltonia parent. Sepals and petals chocolate colour; lip white with purple base.

Certificate of Appreciation.

To H. T. Pitt, Esq., for *Miltonia* × 'William Pitt.'

Other Exhibits.

Sir Jeremiah Colman, Bt.: *Odontoglossum* \times *citrosinum gattonense* and *Dendrobium* \times 'Gatton Sunray.'

R. Gerrish, Esq.: *Odontoglossum* \times 'Fabia' var. 'The King.'

Messrs. Armstrong & Brown: *Laeliocattleya* \times 'Princeps' (*L.-c.* \times 'Ville de Bruxelles' \times *C. Mendelii*).

Messrs. Charlesworth: *Miltonia* \times 'Venus' var. 'Princess Maude.'

ORCHID COMMITTEE, JUNE 26, 1923.

Sir WILLIAM LAWRENCE, Bt., in the Chair, and eleven members present.

Awards Recommended:—

Silver Flora Medal.

To H. T. Pitt, Esq., Rosslyn, Stamford Hill, for a group.

First-class Certificate.

To *Laeliocattleya* \times 'Mrs. Willoughby Pemberton,' the Dell var. ('Baroness Emma' \times *eximia*) (votes unanimous), from Baron Bruno Schröder. The plant bore a spike of three flowers, each eight and a half inches across, light rosy-mauve, with broad ruby-purple front to the lip.

To *Odontoglossum* \times 'Orosius' *magnificum* (*Maillardianum* \times 'Solon') (votes unanimous), from Messrs. McBean, Cooksbridge. Inflorescence bearing fourteen fine flowers of rich ruby-crimson colour with slight white margin and white front to the lip.

Award of Merit.

To *Cattleya* \times *Hentschelii*, Rosslyn var. (*Warscewiczi* \times *Dupreana*) (votes 10 for), from H. T. Pitt, Esq. Flower with *C. Warscewiczi* features but larger. Sepals and petals rosy-mauve; lip ruby-purple.

To *Odontoglossum* \times 'Ernest Bristow' (*Lombardianum* \times *Uro-Skinneri*) (votes 8 for, 2 against), from Messrs. Armstrong & Brown, Tunbridge Wells. A good addition to the *O. Uro-Skinneri* hybrids, to which species the present cross approaches. Sepals and petals claret colour with thin white lines; lip white in front, the basal half purple.

Cultural Commendation.

To Mr. J. E. Shill (gr. to Baron Schröder), for a grand plant of *Laeliocattleya* \times 'Mrs. Willoughby Pemberton.'

To Mr. Thurgood (gr. to H. T. Pitt, Esq.), for *Miltonia Phalaenopsis* with twenty-three flowers.

Other Exhibits.

Pantia Ralli, Esq.: Odontoglossums.

J. N. Hartley, Esq., Pemberton, Wigan: *Miltonia* \times 'A. C. Burrage' (parentage unrecorded).

NARCISSUS AND TULIP COMMITTEE.

FEBRUARY 13, 1923.

Mr. E. A. BOWLES in the Chair, and ten members present.

No awards were made on this occasion, but a vote of thanks was accorded Mr. W. Van de Weyer, Corfe Castle, Dorset, for a pan of *Narcissus Bulbocodium nivalis*.

NARCISSUS AND TULIP COMMITTEE, FEBRUARY 27, 1923.

Mr. W. B. CRANFIELD in the Chair, and thirteen members present.

Awards Recommended :—*Silver-gilt Banksian Medal.*

To Messrs. Barr, for Daffodils.

To Messrs. Bath, for Daffodils and Tulips.

Silver Banksian Medal.

To Messrs. J. Carter, Raynes Park, for Daffodils and Tulips.

Award of Merit.

To *Narcissus 'Golden Herald'* (votes 8 for), for garden purposes. An early, long-stemmed Trumpet variety of golden-yellow colour. From Messrs. Barr.

Other Exhibit:

Narcissus 'Forerunner' (Messrs. Bath) the Committee desired to see again.

NARCISSUS AND TULIP COMMITTEE, MARCH 13, 1923.

Mr. R. W. WALLACE in the Chair, and thirteen members present.

The Committee recorded an expression of deepest sympathy with the Council in the loss it had sustained by the death of the Rev. W. Wilks, who was formerly an energetic member of the Narcissus and Tulip Committee.

Mr. Charles H. Curtis observed that he had acted for twenty-one years as Hon. Secretary of the Committee, and he intimated that, owing to pressure of business, he proposed to resign the position at the end of the present season. He also stated that the new *Classified List of Daffodil Names* would be ready in a week or so.

Awards Recommended :—*Silver-gilt Flora Medal.*

To Messrs. Barr, for Daffodils.

Silver-gilt Banksian Medal.

To Messrs. J. R. Pearson, for Daffodils.

Silver Flora Medal.

To the Donard Nursery Co., for Daffodils.

Silver Banksian Medal.

To Messrs. Bath, for Tulips.

Award of Merit.

To *Narcissus 'Great Dane'* (votes 9 for), for exhibition. A grand rich yellow variety with large, finely frilled trumpet. From Messrs. Barr.

To *Narcissus 'Golden Empress'* (votes 6 for, 1 against), for exhibition. A finely proportioned golden-yellow Trumpet variety. From Messrs. Barr.

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Preliminary Commendation.

To *Narcissus 'Fortune'* (votes 11 for). A perfectly formed *incomparabilis* variety of yellow colouring and orange-yellow crown. From Messrs. H. Chapman.

NARCISSUS AND TULIP COMMITTEE, MARCH 27, 1923.

Rev. G. H. ENGLEHEART, V.M.H., in the Chair, and sixteen members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Barr, for Daffodils.

Silver-gilt Banksian Medal.

To Messrs. Cuthbert, Southgate, for Tulips.

To Messrs. Bath, for Daffodils and Tulips.

To Mr. L. J. Richardson, for Daffodils.

Silver Flora Medal.

To Messrs. J. Carter, for Tulips and Daffodils.

To Messrs. Herbert Chapman, for Daffodils.

Silver Banksian Medal.

To Messrs. J. R. Pearson, for Daffodils.

Bronze Banksian Medal.

To the Maytham Gardens, Rovenden, for Tulips.

Award of Merit.

To *Narcissus 'Provost'* (votes 7 for), for exhibition. A giant Trumpet variety of rich golden-yellow colouring; the perianth segments are slightly twisted. From the Rev. G. H. Engleheart.

To *Narcissus 'Callirhoe'* (votes 11 for), for exhibition. The trumpet of this shapely variety is sulphur-yellow and the perianth white. From Messrs. Herbert Chapman.

To *Narcissus 'Glorious'* (votes 8 for), for garden and cutting. A twin-flowered Peacock variety, white, with flat, orange-coloured crown. From Mr. J. L. Richardson, Waterford.

To *Narcissus 'Prince Umbria'* (votes unanimous), for exhibition. An *incomparabilis* variety of very fine form; perianth white; crown primrose-yellow. From Messrs. Barr.

To *Narcissus 'Golden Sunrise'* (votes 12 for), for garden and cutting. A useful golden-yellow Trumpet variety, with slightly recurring perianth segments. From Messrs. Barr.

Other Exhibit.

Narcissus 'Lady Moore' (Mr. J. L. Richardson) the Committee desired to see again from the open ground.

NARCISSUS AND TULIP COMMITTEE, APRIL 10, 1923.

Mr. E. A. BOWLES in the Chair, and twenty members present.

Awards Recommended :—

Gold Medal.

To Messrs. Barr, for Daffodils.

Silver-gilt Flora Medal.

To the Donard Nursery Co., for choice Daffodils.

Silver-gilt Banksian Medal.

To Messrs. Sutton, for Daffodils.

To Messrs. Bath, for Daffodils.

To Messrs. J. R. Pearson, for Daffodils, including many giant *Leedsii* varieties.

Silver Banksian Medal.

To Messrs. Cartwright & Goodwin, Kidderminster, for Daffodils.
 To Mr. W. F. M. Copeland, Shirley, Southampton, for Daffodils.

Award of Merit.

To *Narcissus 'Puritan Maiden'* (votes 14 for), for exhibition. This Trumpet variety is just over the Leedsi border line. It is a dainty flower, with white perianth and creamy-white trumpet. From Messrs. J. R. Pearson & Sons.

To *Narcissus 'Carola Mills'* (votes 14 for). This Trumpet variety was unnamed when shown. It has a large pale cream-yellow trumpet and white perianth; the flowers are of fine substance. From Capt. E. H. Buxton, Titchfield, Hants.

Preliminary Commendation.

To *Narcissus 'Scarlet Perfection'* (votes 17 for). A splendid sulphur yellow Barrii variety with vivid orange-scarlet cup. From Messrs. Bath.

The *Peter Barr Memorial Cup* was unanimously awarded to Mr. Charles H. Curtis in recognition of his 'good work done in connexion with Daffodils' as Hon. Secretary of the Narcissus and Tulip Committee for twenty-one years.

NARCISSUS AND TULIP COMMITTEE, APRIL 12, 1923.

(*London Daffodil Show.*)

Mr. E. A. Bowles in the Chair, and nineteen members present.

Awards Recommended :--*Gold Medal.*

To Messrs. Barr & Sons, for a group of Daffodils.

Silver-gilt Flora Medal.

To the Donard Nursery Co., for Daffodils.
 To Messrs. J. R. Pearson, for Daffodils.
 To Mr. J. L. Richardson, Waterford, for Daffodils.

Silver-gilt Banksian Medal.

To Messrs. Bath, for Daffodils.
 To the Welsh Bulb Growers' Association, for Daffodils.
 To Messrs. Sutton, for Daffodils.

Silver Flora Medal.

To Messrs. Cartwright & Goodwin, for Daffodils.
 To Mr. W. F. M. Copeland, Shirley, Southampton, for Daffodils.

Silver Banksian Medal.

To Messrs. W. P. Downes, Wisbech, for Daffodils.
 To Mr. Thurston, Fryern, Chandlers Ford, for *Narcissus triandrus* seedlings.
 To Messrs. Warhaar, Holland, for Daffodils.

Award of Merit.

To *Narcissus 'Beauty of Radnor'* (votes unanimous), for exhibition. A graceful *incomparabilis* variety with white perianth and lemon-yellow, orange-rimmed crown. From Dr. N. Y. Lower, Presteign, Radnor.

To *Narcissus 'Red Rim'* (votes unanimous), for exhibition. An attractive Poeticus variety with milk-white perianth and flat, yellow, red-margined crown. From Rev. G. H. Engleheart.

To *Narcissus 'Dinton Red'* (votes 14 for), for exhibition. A grandly formed Poeticus variety; white, with vivid orange crown. From the Rev. G. H. Engleheart.

To *Narcissus 'Widewing'* (votes 15 for), for exhibition. A Poeticus variety with paper-white perianth and yellow crown, the latter with an orange-scarlet rim. From Rev. G. H. Engleheart.

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To *Narcissus* 'Miss Helen O'Hara' (votes unanimous), for exhibition. A large white Trumpet variety of fine substance. From Mr. J. L. Richardson.

To *Narcissus* 'Dulcimer' (votes 12 for), for garden and cutting. A very long-stemmed Poeticus variety with milk-white perianth and scarlet-rimmed crown. From Capt. Hawker, Strode, Devonshire.

To *Narcissus* 'Dainty Maid' (votes 12 for, 1 against), for exhibition. This finely formed Poeticus variety has a lemon-yellow crown edged with dull orange. From Messrs. Bath.

To *Narcissus* 'Red Guard' (votes 12 for), for exhibition. A striking novelty with buff-orange perianth segments and orange-scarlet cup. From Messrs. Bath.

To *Narcissus* 'Owen' (votes 6 for). A Barrii variety with primrose-coloured perianth and orange-yellow cup. From the Welsh Bulb Growers' Association.

NARCISSUS AND TULIP COMMITTEE, APRIL 24, 1923.

Mr. E. A. Bowles in the Chair, and fifteen members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Barr, for Daffodils and Tulips.

Silver Flora Medal.

To Messrs. Bath, for Daffodils and Tulips.

Silver Banksian Medal.

To Messrs. Sutton, for Daffodils.

To Mr. W. B. Cranfield, Enfield Chase, for rare Daffodils.

Award of Merit.

To *Narcissus* 'Intensity' (votes 9 for), for exhibition. A beautiful Poeticus variety of fine form and substance; white, with red crown. From Rev. G. H. Engleheart.

To *Narcissus* 'Mainsail' (votes 9 for), a large Poeticus variety, white, with yellow, red-rimmed crown. From Rev. G. H. Engleheart.

To *Narcissus* 'Roland' (votes 5 for). This Poeticus variety has solid white flowers and a flat, orange-coloured, crimson-edged cup. From Rev. G. H. Engleheart.

To *Narcissus* 'Opera' (votes 11 for), for exhibition. A bold and attractive Poeticus variety; perianth pure white; crown orange-yellow with broad red rim. From Mr. W. B. Cranfield.

Other Exhibit.

Narcissus 'Dactyl,' from Messrs. H. Chapman, the Committee desired to see again.

NARCISSUS AND TULIP COMMITTEE, MAY 8, 1923.

Sir A. DANIEL HALL in the Chair, and seventeen members present.

Awards Recommended :—

Gold Medal.

To Messrs. Barr, for Tulips, including Old English varieties.

To Messrs. Dobbie, Edinburgh, for well-grown Tulips.

Silver-gilt Flora Medal.

To the Welsh Bulb Farm, St. Asaph, for Tulips.

Silver-gilt Banksian Medal.

To Messrs. J. R. Pearson, for Tulips.

Silver Flora Medal.

To Messrs. Bath, for Tulips.

Silver Banksian Medal.

To Messrs. G. Bunyard, for Tulips.

Bronze Banksian Medal.

To Mr. B. Pinney, Dulverton, for Tulips.

Award of Merit.

To *Tulip 'Alcemene'* (votes 10 for, 1 against), a Cottage variety with broad cup shaped flowers; cerise, with white, blue-margined base. From Messrs. Bath.

Other Exhibit.

Narcissus 'Rivulet.' shown by Mr. W. B. Cranfield, the Committee desired to see again.

. EXTRACTS FROM THE PROCEEDINGS
OF THE
ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETING.

JULY 10, 1923.

The Rt. Hon. Lord LAMBOURNE, P.C., in the Chair.

One hundred and twenty-three Fellows were elected, and one Society affiliated.

GENERAL MEETING.

JULY 24, 1923.

R. W. ASCROFT, Esq., M.B.E., in the Chair.

Fifty-seven Fellows and one Associate were elected, and one Society affiliated.

The Masters Memorial Lecture was given by Dr. A. B. Rendle, F.R.S.

GENERAL MEETING.

AUGUST 8, 1923.

The Rt. Hon. Lord LAMBOURNE, P.C., in the Chair.

Forty-seven Fellows were elected, and one Society affiliated.

GENERAL MEETING.

AUGUST 21, 1923.

C. T. MUSGRAVE, Esq., in the Chair.

Thirty-one Fellows and one Associate were elected, and four Societies affiliated.

GENERAL MEETING.

SEPTEMBER 4, 1923.

The Rt. Hon. Lord LAMBOURNE, P.C., in the Chair.

Thirty-four Fellows were elected, and one Society affiliated.

The Foremarke Challenge Cup for Gladioli was awarded to Messrs. Lowe & Gibson, Crawley Down.

GENERAL MEETING.

SEPTEMBER 18, 1923.

E. A. BUNYARD, Esq., F.L.S., in the Chair.

Thirteen Fellows and two Associates were elected.

A lecture was given by Dr. F. W. Darbshire on "Green Manuring at Wisley."

HOLLAND PARK SHOW.

OCTOBER 2, 3, 4, 1923.

LIST OF JUDGES.

ALLGROVE, J. C.	HARRISS, E.	PEARSON, A. H., J.P., V.M.H.
BARNES, N. F.	HAY, T.	POPE, W.
BARTHOLOMEW, A. C., V.M.H.	JANES, E. R.	RIVERS, H. SOMERS.
BASHAM, J.	JONES, H. J.	SANDER, F. K.
BATES, W.	JORDAN, F.	SMITH, H. H.
BEAN, W. J., V.M.H.	KELF, G.	STEVENSON, T.
BECKETT, E., V.M.H.	LOBJOIT, W.	STEWART, W.
BULLOCK, A.	LUCAS, C. J.	TURNER, A.
Cousins, F. G.	MARKHAM, H.	VAN ZYL, Major G. BRAND
CRANE, D. B.	MERRYWEATHER, E. A.	VEITCH, P. C. M., J.P., V.M.H.
DARLINGTON, Mrs.	MESSEL, Lt.-Col. L. C. R.	WARRENDER, Lt.-Col. H.
DICKS, S. B.	METCALFE, A. W.	WESTON, J. G.
DIVERS, W. H., V.M.H.	MORRIS, S.	WHITTON, J., V.M.H.
FIELDER, C. R., V.M.H.	MORTER, W. H.	WILSON, G.
GILES, W. F.	NEAL, E.	WOODWARD, G.
GINGELL, W. B.	NIX, C. G. A., V.M.H.	
GOSDEN, C.	NOTCUTT, R. C.	
HANBURY, F. J.	PAYNE, C. HARMAN	

List of Awards.

CHALLENGE CUPS.

Coronation Cup.

To the Hon. Vicary Gibbs (gr. E. Beckett), for the most meritorious group.

Wigan Cup.

To Mr. G. Prince, for the best exhibit of Roses.

George Monroe Cup.

To Mr. W. H. Thickett, for the best exhibit of Grapes by an amateur.

CHRYSANTHEMUMS AND DAHLIAS.

Large Silver Cup.

To Messrs. Dobbie & Co., for Dahlias.

Small Silver Cup.

To Messrs. K. Luxford & Co., for Chrysanthemums.

To Mr. C. Turner, for Dahlias.

Silver-gilt Flora Medal.

To Messrs. Carter Page & Co., for Dahlias.

To Mr. J. B. Riding, for Dahlias.

To Messrs. W. Treseder, Ltd., for Dahlias.

To Mr. J. T. West, for Dahlias.

Silver-gilt Banksian Medal.

To Messrs. Jarman & Co., for Dahlias.

To Mr. Wm. Yandell, for Chrysanthemums.

Silver Banksian Medal.

To Messrs. J. Cheal & Sons, for Dahlias.

GREENHOUSE FLOWERS, ETC.

Large Silver Cup.

To Mr. C. Engelmann, for Carnations.

Small Silver Cup.

To Mr. S. Smith, for Cacti.

To Messrs. Blackmore & Langdon, for Begonias, etc.

To Messrs. L. R. Russell, Ltd., for Clematis and stove plants.

Silver-gilt Flora Medal.

To Messrs. Allwood Bros., for Carnations.

To Messrs. Stuart Low & Co., for Carnations.

Silver-gilt Banksian Medal.

To Messrs. Allwood Bros., for group of Carnations.

Silver Flora Medal.

To Mr. E. H. Causer, for Cyclamen, Primulas, etc.

To Messrs. K. Luxford & Co., for Carnations.

SHRUBS.

Large Silver Cup.

To Messrs. Hillier & Sons, for Conifers, hardy trees, shrubs, etc.

Small Silver Cup.

To Messrs. J. Cheal & Sons, for ornamental shrubs.

To Mr. G. Reuthe, for hardy plants.

To Messrs. R. Wallace & Co., for shrubs.

Silver-gilt Flora Medal.

To Messrs. A. Charlton & Sons, for hardy trees and shrubs.

Silver-gilt Banksian Medal.

To Messrs. R. & G. Cuthbert, for Conifers, flowering shrubs and Ericas.

To Messrs. Clarence Elliott, Ltd., for dwarf shrubs.

Silver Flora Medal.

To Messrs. Robt. Green, Ltd., for Palms and Bay trees.

To Mr. John Klinkert, for clipped Yew and Box trees in tubs.

Silver Banksian Medal.

To Messrs. W. H. Rogers & Son, for shrubs.

Silver Lindley Medal.

To Messrs. Hillier & Sons, for rare plants of special interest.

ROSES.

Large Silver Cup.

To Mr. George Prince, for Roses.

Small Silver Cup.

To Mr. W. E. Chaplin, for Roses.

To Mr. Elisha Hicks, for Roses.

To Mr. John Mattock, for Roses.

Silver-gilt Flora Medal.

To Messrs. B. R. Cant & Sons, for Roses.

To Messrs. D. Prior & Son, for Roses.

Silver-gilt Banksian Medal.

To Messrs. Alex. Dickson & Sons, for Roses.

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Silver Flora Medal.

To Rev. J. H. Pemberton, for Roses.
To Messrs. Waterer, Sons & Crisp, for Roses.

ORCHIDS.

Gold Medal.

To Messrs. Charlesworth & Co., for Orchids.

Large Silver Cup.

To Messrs. Stuart Low & Co., for Orchids.

Silver-gilt Flora Medal.

To Messrs. Flory & Black, for Orchids.
To Messrs. Mansell & Hatcher, for Orchids.

VEGETABLES (Non-competitive Groups).

Gold Medal.

To the Hon. Vicary Gibbs (gr. Mr. E. Beckett), for vegetables.
To Messrs. Sutton & Sons, for vegetables.

Large Silver Cup.

To Messrs. Dobbie & Co., for Potatos.

Silver Knightian Medal.

To Messrs. H. Chapman, Ltd., for vegetables.

FRUIT TREES IN POTS (Non-competitive Groups).

Large Silver Cup.

To Mr. J. C. Allgrove, for fruit trees in pots and fruit.

Small Silver Cup.

To Messrs. John Waterer, Sons & Crisp, for fruit.

Silver-gilt Hogg Medal.

To Messrs. T. Rivers & Sons, for fruit trees in pots.

FRUIT (Non-competitive Groups).

Gold Medal.

To Messrs. G. Bunyard & Co., Ltd., for fruit.

Large Silver Cup.

To Barnham Nurseries, Ltd., for fruit.

Small Silver Cup.

To Messrs. Daniels Bros., Ltd., for fruit.

Silver-gilt Hogg Medal.

To Studley College, for hardy fruit.

Silver Hogg Medal.

To Horticultural College, Swanley, for fruit.
To Messrs. S. Spooner & Son, for collection of fruit.
To Mr. E. A. Watts, for collection of fruit.

HERBACEOUS PLANTS, ETC.

Large Silver Cup.

To Messrs. R. Wallace & Co., for hardy plants.

Small Silver Cup.

To Messrs. Bowell & Skarratt, for alpines, etc.
To Messrs. G. Jackman & Son, for Clematis and hardy plants.

Silver-gilt Flora Medal.

To Messrs. Isaac House & Son, for *Scabiosa caucasica*.
 To Mr. Ernest Ballard, for Michaelmas Daisies.
 To Mr. H. J. Jones, for Michaelmas Daisies.
 To Messrs. John Waterer, Sons & Crisp, for herbaceous plants.
 To Messrs. Dickson & Robinson, for Michaelmas Daisies.
 To Mr. Amos Perry, for hardy plants and ferns.
 To Messrs. Harkness & Son, for hardy flowers.
 To Messrs. R. Bath, Ltd., for Gladioli.

Silver-gilt Banksian Medal.

To Messrs. W. H. Rogers & Son, for alpines, etc.
 To Messrs. Maxwell & Beale, for hardy plants and alpines.
 To Mr. W. Artindale, for hardy plants.
 To Messrs. Bakers, Ltd., for hardy plants.
 To Messrs. Wm. Cutbush & Son, Ltd., for hardy plants.
 To Mr. W. Wells, jun., for hardy plants.
 To Mr. Alva J. Hall, for Campanulas, etc.
 To Messrs. Lowe & Gibson, for Gladioli.

Silver Flora Medal.

To Mr. F. G. Wood, for rock and hardy plants.
 To Messrs. B. Ladhams, Ltd., for Lobelias.
 To Messrs. Blackmore & Langdon, for Michaelmas Daisies
 To Mr. Thomas Carlile, for hardy plants.
 To Messrs. Dobbie & Co., Ltd., for Sweet Peas.
 To Messrs. Kelway & Son, for Gladioli.
 To Messrs. G. Gibson & Co., for hardy plants.

Silver Banksian Medal.

To Mr. G. G. Whitelegg, for alpine plants in pans.
 To Mr. E. Scaplehorn, for herbaceous plants.
 To Mr. J. J. Kettle, for Violets.
 To Mr. B. Pinney, for Violets.
 To Central Garden Supplies, for Violas, herbaceous plants, etc.
 To Messrs. John Forbes (Hawick), Ltd., for hardy plants.
 To Mr. H. Vigers, for Delphiniums.

Silver-gilt Flora Medal.

To Mr. James MacDonald, for grasses.

BRITISH-GROWN FRUIT SHOW, HELD IN CONNEXION WITH
THE HOLLAND PARK SHOW.

CHIEF AWARDS.

Class 1. Amateurs. Collection of ripe dessert fruits. *First Prize*.—Sir Chas. Nall-Cain (gr. Mr. T. Pateman).

Class 14. Trade. Collection of hardy fruits. *Silver-gilt Hogg Medal*.—The Orpington Nursery Co., Kent.

Class 17. Amateurs. Collection of Apples. *Silver-gilt Medal of the Fruiterers' Company*.—Sir Chas. Nall-Cain (gr. Mr. T. Pateman).

The Affiliated Societies' Challenge Cup for Apples and Pears.—The East Anglian Horticultural Club.

BRITISH-GROWN VEGETABLE SHOW, HELD IN CONNEXION
WITH THE HOLLAND PARK SHOW.

CHIEF AWARDS.

Class 1. Twelve kinds of vegetables distinct. *First Prize*: *The Sutton Challenge Cup*.—Rev. J. Davies, Crowle Vicarage, Worcester.

The R.H.S. Challenge Cup to the exhibitor gaining the greatest number of First Prize points.—R. Chetwynd Stapylton, Esq., Headlands, Berkhamsted (gr. Mr. W. Meager), 12 points.

GENERAL MEETING.

OCTOBER 16, 1923.

The Rt. Hon. Lord LAMBOURNE, P.C., in the Chair.

Two hundred and forty-four Fellows and nine Associates were elected, and four Societies affiliated.

GENERAL MEETING.

OCTOBER 30, 1923.

W. R. DYKES, Esq., M.A., in the Chair.

Seventy-five Fellows and one Associate were elected, and two Societies affiliated.

A lecture was given by Mr. Gurney Wilson on "Orchid Species and Hybrids."

ORCHID CLASSES.

Amateurs.

Large Silver Cup.—Baron Bruno Schröder.

Small Silver Cup.—H. T. Pitt, Esq.

Gold Medal.—Pantia Ralli, Esq.

Silver-gilt Flora Medal.—J. J. Joicey, Esq.

Trade.

Gold Medal.—Messrs. Charlesworth & Co., Messrs. J. A. McBean, Messrs. Sanders.

Silver-gilt Flora Medal.—Messrs. Stuart Low & Co., Messrs. Cowan & Co.

Silver Flora Medal.—Messrs. Flory & Black, Messrs. J. Cypher & Son.

Silver Banksian Medal.—Mr. H. Dixon, Messrs. Mansell & Hatcher.

GENERAL MEETING.

NOVEMBER 13, 1923.

The Rt. Hon. Lord LAMBOURNE, P.C., in the Chair.

Eighty-seven Fellows and one Associate were elected, and four Societies affiliated.

GENERAL MEETING.

NOVEMBER 27, 1923.

Dr. A. W. HILL, D.Sc., in the Chair.

Fifty-two Fellows and one Associate were elected, and two Societies affiliated.

A lecture was given by Dr. H. E. Durham on "The Beauty and Use of the Vintage Pear."

GENERAL MEETING.

DECEMBER 11, 1923.

The Rt. Hon. Lord LAMBOURNE, P.C., in the Chair.

Sixty-four Fellows and two Associates were elected, and three Societies affiliated.

SCIENTIFIC COMMITTEE.

JULY 10, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, and four members present.

Pine for naming.—A pine was received from Mr. C. J. Lucas for naming, which Mr. Fraser had identified as *P. montana* var. *rotundata*.

Thistle fasciated.—Mr. Fraser showed a fasciated specimen of the Scotch thistle.

"Hen-and-Chickens" Marigold.—Mr. Jacob of Bexley sent a common Marigold having the "Hen-and-Chickens" habit—i.e. throwing out branches bearing flower heads from the capitula. Seeds produced by these plants reproduced the habit.

Parti-coloured spike of Delphinium.—Lady Bisset sent a curious flower of Delphinium in which one side was white and the other blue. The whole spike showed this variation. The variety was originally white (*Moerheimii*), and half the spike had sported to the "Capri" form.

SCIENTIFIC COMMITTEE, JULY 24, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, and six members present.

Conifer for name.—Mr. Fraser reported that the Conifer sent for name at the previous meeting by Mr. Blakesley, Fairlawn, Redhill Common, was *Abies nobilis*, and the cone that of *Picea excelsa*.

Various plants.—Mr. Fraser showed (1) a gall on the male catkins of *Salix triandra* caused by *Cecidomyia heterobia*; (2) *Trifolium repens* with much elongated flower pedicels and pods; (3) a piece of the bark of *Eucommia ulmoides*, the latex of which yields "gutta-percha," not rubber.

Variegation in Raspberry.—Mr. Worsley made some remarks on variegation in Raspberry canes, pointing out that the suckers from variegated shoots only gave green leaves, whereas if the basal buds of the variegated shoots were propagated the variegation was reproduced.

Dianthus hybrid.—Mr. Dawkins sent a cross between a Sweet-William and an unrecorded species of a Dianthus.

Various Plants.—Mr. Bowles showed variegated shoots of *Polygonum cuspidatum* and three fruiting species of *Rubus*—*R. bambusarum*, *R. flagelliformis*, and *R. Henryi*, the latter being edible.

Colour variation in Roses.—Mr. Godwin, Blake Street Nursery, Fourgate, Sutton Coldfield, sent a truss of three Roses, the central flower being a pale pink and the two lateral ones a very dark pink. The Committee thought this was due to the abnormal heat whilst the central flower was opening.

SCIENTIFIC COMMITTEE, AUGUST 8, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, and one other member present.

The only business before the meeting was the naming of a large magenta-coloured Bougainvillea from Perthshire, which proved to be *B. spectabilis*.

SCIENTIFIC COMMITTEE, SEPTEMBER 18, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, and seven members present.

Triple Plum.—Mr. J. H. Dipnall sent fruits of the Blackthorn showing three separate fruits at the apex of a single stalk and developed from a single flower.

Larch manna.—Dr. A. Henry brought specimens of a larch with a sugar-like substance on the twigs, sent to him by Dr. Keller, Professor of Zoology, the

Ixxviii PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

Polytechnic, Zurich. This sugar-like substance is known as the manna of the larch. It is very rarely seen, occurring only in seasons of exceptional drought. It is produced by the larch aphis (*Lachnus laricis*). The secretion is in liquid form and drops to the ground in normal weather, but in very hot weather it crystallizes and forms manna. The manna is used as a drug. Three years ago similar manna was observed to occur in America in the Douglas fir, thus supporting Dr. Henry's view that the Douglas fir and the larch are closely allied.

Epipactis latifolia.—Mr. Fraser showed flowers of *Epipactis latifolia* with normal ovaries collected from the plants exhibited last year.

Pyrus hybrid.—Mr. Fraser showed specimens collected in Surrey of *Pyrus Meiniashii* (*P. Aucuparia* × *P. intermedia*) bearing fruits, showing that this hybrid is fertile.

Hybrid Nicotianas.—Mr. Hosking brought specimens of a hybrid *Nicotiana*, which Mr. Good of the Natural History Museum believes to be *N. Tabacum* × *N. Langsdorffii*.

Supposed hybrid Potato × Tomato.—Mr. Hosking also brought a specimen in fruit of a Tomato plant raised from seed obtained from fruits sent last year by Mr. Achurch, of Sandy, Beds, who stated that he raised the plant from seed taken from a potato, and who supposed it to be a hybrid between the potato and the tomato. The plants grown show no signs of hybrid origin. The foliage is larger and coarser, especially in the seedling stage, than are those usually grown in British gardens. They resemble the old variety grown under the name of 'King Humbert,' and may be what the Americans grow as the Potato-leaved Tomato.

Various exhibits.—Dr. Voelcker showed tubers from East Africa which have been identified as *Dioscorea triphylla*. He also showed samples of hay made in the north of England by artificial drying, the method being to force air through the heap of newly mown hay. The samples appeared to be well cured and equal to sun-dried hay. Further work is in progress in the north of England, where considerable difficulty is sometimes experienced in saving the hay crop.

Apples damaged by badgers.—Mr. F. J. Baker showed some apples badly damaged by a badger. The fruits were grown on cordon trees and those damaged were early dessert varieties.

Actinidia chinensis fruiting.—Mr. G. W. E. Loder showed fruits of *Actinidia chinensis*.

Various plants.—Mr. Bowles showed specimens of *Leucanthemum Fontaneau* from Algiers, and *Verbena maritima* from Florida.

Loss of scent in musk.—Mr. Ascroft reported on some inquiries he had made regarding loss of scent in *Mimulus moschatus*.

Celsia for naming.—A species of Celsia raised from seed obtained from Casablanca, Morocco, came from Mrs. G. Dickson Park, Sedgmoor, Flackswell Heath, Bucks.

SCIENTIFIC COMMITTEE, OCTOBER 16, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, and nine members present.

Sport in Geum.—Mr. Fraser showed a sport of the Geum 'Mrs. Bradshaw,' precisely similar to the variety 'John Bradshaw.'

Tanacetum Balsamita.—He also showed a specimen of this plant long since introduced into British gardens.

Phylloxera quercina, etc..—Mr. Hales showed a specimen in spirit of an oak leaf bearing large numbers of specimens of *Phylloxera quercina* attacked by the larvae of the lacewing fly.

Kniphofia seedling.—Mr. Hosking also showed a specimen of *Kniphofia comosa* to call attention to its peculiar habit of starting flowering at the top and opening its flowers successively downwards, whereas most start flowering at the bottom and open successively upwards.

SCIENTIFIC COMMITTEE, OCTOBER 30, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, and six members present.

Various plants.—Mr. Hosking showed specimens of the succulent plants *Crassula Bolusii*, *C. Cooperi*, and *Sedum virescens*. He also showed the Gesnerad *Lysionotus serrata* raised by Mr. Elwes from seed collected by Mr. Forrest in China (F. 15700).

Fasciation in Michaelmas Daisies.—Mr. Bowles showed, from Mrs. G. Botfield, several spikes of Michaelmas Daisies showing fasciation of the upper parts.

Aberrant Gentiana Asclepiadea.—He also showed an inflorescence of *Gentiana Asclepiadea*, in which the terminal flowers had coalesced to form a broad cup-shaped flower with many more than the normal number of parts.

House Martin captured by Burdock.—Dr. Voelcker sent a photograph showing a house martin captured by the inflorescence of the burdock, the hooks upon which had entangled themselves among the bird's feathers.

SCIENTIFIC COMMITTEE, NOVEMBER 13, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, and five members present.

Variation in Senecio squalidus.—Mr. Fraser showed a series of seedlings of *Senecio squalidus* to illustrate the variation which occurs in this plant. He finds two marked forms (with intermediates), one having divided foliage, the other having almost entire leaves. It seems to have spread first from the Botanic Gardens at Oxford, and is now found wild from Chiswick to Kew and Richmond.

Novel method of seed sowing.—From Mr. W. S. Chamberlain, of Moormead Road, Twickenham, came an illustration of the value of moss as a nidus for seed sowing. Seeds of *Gerbera Jamesonii* (often difficult of germination) were sown on a ball of the moss *Leucobryum glaucum* contained in a flower-pot. They had germinated well and rapidly, and were easily removed for transplanting by breaking the ball of moss asunder.

Tecoma capensis.—This somewhat uncommon plant was sent from the Mill House, Horsham, for naming.

SCIENTIFIC COMMITTEE, NOVEMBER 27, 1923.

Mr. E. A. BOWLES, M.A., V.H.M., in the Chair, and four members present.

Leaf-cutting bee.—Mr. Fraser showed leaves of *Lapageria*, and remarked that this and both *Plumbago capensis* and *Heliotrope* had been used by leaf-cutting bees which had worked in a greenhouse. He had also seen leaves of Mountain Ash used for the same purpose. Mr. Chittenden remarked that Lilacs were invariably attacked in his own garden.

Foxglove peloria.—Mr. Fletcher sent a photograph of a foxglove showing peloria and duplication of parts in the terminal flower, a phenomenon now well known and fixed. He also sent a conifer for naming.

SCIENTIFIC COMMITTEE, DECEMBER 11, 1923.

Mr. E. A. BOWLES, M.A., V.M.H., in the Chair, and seven members present.

Conifer for naming.—Mr. Fraser reported that he had examined the conifer sent to the last meeting for a name, and found it to be *Cupressus lusitanica*, var. *Benthamic*.

Hazel with two kernels.—Mr. Fraser also showed a hazel nut containing two seeds. He regarded this condition as a reversion to an ancestral type. A plum with two fruits was also developed from a bicarpellary flower.

Cypripedium vars. growing wild.—Mr. Gurney Wilson showed *C. insigne* var. *Mauleri* and one near var. *Bonhoeferianum*.

Cremanthodium and Saussurea.—Mr. Chittenden showed a long series of dried specimens of species of *Cremanthodium* and *Saussurea*, collected by Mr. George Forrest.

FRUIT AND VEGETABLE COMMITTEE.

JULY 10, 1923.

Mr. P. C. M. VETCH, V.M.H., in the Chair, and eleven members present.

Awards Recommended :—

Silver-gilt Bunyard Medal.

To Messrs. Dean, Sittingbourne, for Cherries.

To Sir Charles Nall-Cain, Bt. (gr. Mr. Pateman), Welwyn, for Cherries.

Silver Bunyard Medal.

To Messrs. G. Webb, Sittingbourne, for Cherries.

Bronze Knightian Medal.

To the Guild of Blind Gardeners, Hampstead, for vegetables.

Cultural Commendation.

To Sir Charles Nall-Cain, Bt. (gr. Mr. Pateman), Welwyn, for Peaches.

Other Exhibit.

Messrs. Gill, Falmouth : Strawberry 'Gills' A.R.'

FRUIT AND VEGETABLE COMMITTEE, JULY 24, 1923.

Mr. C. G. A. NIX, V.M.H., in the Chair, and sixteen members present.

Awards Recommended :—

Gold Medal.

To Messrs. J. C. Allgrove, Slough, for Gooseberries.

Silver-gilt Bunyard Medal.

To F. C. Stoop, Esq., Byfleet (gr. Mr. Carpenter), for Gooseberries.

Bronze Bunyard Medal.

To Sir Charles Nall-Cain, Bt. (gr. Mr. Pateman), Welwyn, for Gooseberries.

Other Exhibits.

Messrs. Laxton, Bedford : Strawberry 'Omega.'

Mr. A. J. Morgan, Devoran : seedling Raspberry.

R.H.S. Gardens, Wisley : Gooseberries.

Sir Charles Nall-Cain, Bt., Welwyn : seedling Raspberry.

FRUIT AND VEGETABLE COMMITTEE, AUGUST 8, 1923.

Mr. J. CHEAL, V.M.H., in the Chair, and eleven members present.

No awards were recommended on this occasion.

Exhibits.

Messrs. F. Woolard, Brighton : seedling Blackberry.

Mr. J. H. Parr, Bawtry : Peaches for naming.

FRUIT AND VEGETABLE COMMITTEE, AUGUST 21, 1923.

Mr. J. CHEAL, V.M.H., in the Chair, and fourteen members present.

Awards Recommended :—

Silver-gilt Hogg Medal.

To J. A. Nix, Esq., Crawley (gr. Mr. Neal), for Grapes, etc.

Silver-gilt Knightian Medal.

To Messrs. Barr, Covent Garden, for Vegetables.

A Red Currant seedling, from Messrs. Daniels, Norwich, was recommended for inclusion in the Commercial Fruit Trials at Wisley.

Other Exhibits.

Messrs. Daniels, Norwich : Black Currant 'Daniels' September.'

Messrs. Charles Turner, Slough : Grapes for opinion.

The recommendations made by the Sub-Committee visiting Wisley to judge the Marrows and Currants were confirmed as follows :—

VEGETABLE MARROWS.

Highly Commended.

'First of All,' sent by Messrs. Cooper, Taber.

'Long Green Running,' sent by Messrs. Watkins & Simpson.

'Green Bush,' sent as 'Chusan Green' by Messrs. Barr.

{ 'Green Bush,' sent by Messrs. Nutting.

'Kings Acre Cream,' sent by Messrs. Barr.

'Moore's Cream Striped,' sent by Messrs. Nutting.

'Rotherside Orange,' sent by Messrs. W. H. Simpson & Sons.

Commended.

'Long White Smooth,' sent by Messrs. Watkins & Simpson.

'Long Island Bush,' sent by Messrs. Watkins & Simpson.

'Custard,' sent by Messrs. W. H. Simpson & Sons.

RED CURRANTS.

Award of Merit.

'Perfection,' sent by Messrs. Laxton Bros.

Highly Commended.

'Comet,' sent by Messrs. Laxton Bros. and Messrs. T. Harraway & Sons.

'Fox's New Red,' sent by Messrs. Laxton Bros.

Commended.

'Houghton Castle,' sent by Messrs. T. Harraway & Sons.

'Southwell Red,' sent by Messrs. Merryweather & Son.

'Bridgeford Red,' sent by Messrs. Merryweather & Son.

'Littlecroft Beauty,' sent by Messrs. Whitelegg & Co.

The award to 'Littlecroft Beauty' is made for cropping qualities, but with the reservation that this variety is suited for growing only in sheltered places

WHITE CURRANTS.

Award of Merit.

'White Versailles,' sent by Royal Horticultural Society.

BLACK CURRANTS.

Highly Commended.

'Hatton Giant,' sent by Mr. H. Jones.

FRUIT AND VEGETABLE COMMITTEE, SEPTEMBER 4, 1923.

Mr. J. CHEAL, V.M.H., in the Chair, and eight members present.

The recommendations made by the Sub-Committee visiting Wisley to judge the Onions, Cucumbers, Runner Beans, and Climbing French Beans were confirmed as follows:—

SPRING-SOWN ONIONS.

Award of Merit.

- 'Silver Globe,' sent by Messrs. Barr.
- 'Anglo-Spanish' (sent as 'Giant Zittau'), sent by Mr. Heinemann.
- 'Premier,' sent by Messrs. Dickson & Robinson.
- 'Rousham Park Hero,' sent by Messrs. Watkins & Simpson.

{ *Highly Commended.*

- 'Rousham Park Hero' selected, sent by Messrs. Barr.
- 'Maincrop,' sent by Messrs. Dobbie.
- 'White Spanish' (sulphur-yellow type), sent by Messrs. Cooper, Taber.
- 'Ailsa Craig,' sent by Messrs. Morse.
- 'Cranston's Excelsior,' sent by Messrs. A. Dickson.
- 'Bedfordshire Champion,' sent by Messrs. Watkins & Simpson, Barr.
- 'Density,' sent by Messrs. A. Dawkins.
- 'Golden Globe,' sent by Messrs. Dobbie.
- 'Ohio Yellow Globe,' sent by Messrs. Morse.
- 'Ohio Yellow Globe' (sent as 'Danvers Yellow Globe'), sent by Messrs. Nutting.
- 'Up-to-Date,' sent by Messrs. A. Dickson.
- 'Australian Brown,' sent by Messrs. Morse.
- 'Red Flag,' sent by Messrs. Kelway.
- 'White Portugal' (silver white), sent by Messrs. Morse.
- 'Covent Garden Silver Skinned,' sent by Messrs. Barr.
- 'Ailsa Craig' (but of 'Prizetaker' type), sent by Messrs. Cooper, Taber.

Commended.

- 'White Spanish' (French seed, straw coloured), sent by Messrs. Cooper, Taber.
- 'Giant Zittau,' sent by Messrs. Watkins & Simpson.

CUCUMBERS.

Award of Merit.

- 'Blair's Prolific,' sent by Messrs. Barr.
- 'Telegraph' (Rollison's), sent by Messrs. Barr.
- 'Everyday,' sent by Messrs. Barr.
- 'Perfection Ridge' (Ridge var.), sent by Messrs. Watkins & Simpson.

Highly Commended.

- 'Lockie's Perfection,' sent by Messrs. Watkins & Simpson, Barr.
- 'Ideal,' sent by Messrs. Barr.
- 'Ideal,' sent by Messrs. Dicks.
- 'Jasper Queen,' sent by Mr. G. Carpenter, Byfleet.
- 'Sensation' (Ridge var.), sent by Mr. Heinemann.

Commended.

- 'X L All,' sent by Messrs. Barr.
- 'Telegraph Improved,' sent by Messrs. W. H. Simpson & Sons.

RUNNER BEANS.

Award of Merit.

- 'Bounteous,' sent by Messrs. Dickson & Robinson.
- 'Prizewinner,' sent by Messrs. Kelway.
- 'Colossal,' sent by Messrs. Dickson & Robinson.
- 'Czar,' sent by Messrs. Toogood.

Highly Commended.

- 'Scarlet Emperor,' sent by Messrs. W. H. Simpson & Sons.
- 'Sir Douglas Haig,' sent by Messrs. Kelway.
- 'Prizewinner' (dark selection), sent by Messrs. W. J. Unwin.
- 'Czar,' sent by Messrs. Kelway, W. H. Simpson & Sons.
- 'White Emperor,' sent by Messrs. A. Dickson & Sons.

CLIMBING FRENCH BEANS.

Award of Merit.

- 'Phenomene,' sent by Messrs. Watkins & Simpson.
- 'July,' sent by Messrs. Carter.

Highly Commended.

- 'Mont d'Or,' sent by Messrs. Barr.
- 'Délicatesse,' sent by Messrs. Barr.

Exhibits.

- Messrs. Daniels, Norwich : Black Currant 'Daniels' September,' and Apples.
- Mr. E. Lansdell, Christchurch : Raspberry 'St. Regis.'
- Messrs. W. J. Lobjoi, Hounslow : Apple 'Worcester Pearmain.'
- Mr. W. Cairns, Biggleswade : Seedling Melon.

FRUIT AND VEGETABLE COMMITTEE, SEPTEMBER 18, 1923.

Mr. J. CHEAL, V.M.H., in the Chair, and eleven members present.

Awards Recommended :—*Silver-gilt Hogg Medal.*

- To Messrs. T. Rivers, Sawbridgeworth, for fruit trees in pots.

Silver Hogg Medal.

- To Messrs. J. C. Allgrove, Slough, for fruit trees in pots.

Bronze Knightian Medal.

- To the Guild of Blind Gardeners, Hampstead, for vegetables.

Award of Merit.

- To Apple 'George Neal' (votes unanimous), from Messrs. R. Neal, Wandsworth. This is a dual purpose variety, being excellent for cooking and dessert. The fruits are fairly large, round, somewhat flattened and even in outline. The colour is pale greenish-yellow with red flush and stripes over the greater part of one side. Eye open in a broad even basin ; flesh white and juicy, of excellent flavour. It is a vigorous grower, and trees but a few years old crop heavily. It originated in a cottage garden at Otford, Kent.

This Apple was recommended for inclusion in the Commercial Fruit Trials at Wisley.

Other Exhibits.

- Messrs. Daniels, Norwich : Black Currant 'Daniels' September,' and Apples.
- Sir Charles Nall-Cain, Bt., Welwyn : Raspberry 'Heytor.'
- Messrs. G. Trinder, Fleet : Raspberry 'Golden Hornet.'

FRUIT AND VEGETABLE COMMITTEE, OCTOBER 2, 1923.

Mr. C. G. A. NIX, V.M.H., in the Chair, and thirty-three members present.

No awards were recommended on this occasion.

Exhibits.

- F. C. Stoop, Esq., West Hall, Byfleet : Apple 'Comrade.'
- Capt. M. Drummond, Southampton : Apple 'Cadland.'
- Mrs. T. S. Hall, Chard : Grape 'Mrs. Hall.'
- Mr. R. Holmes, Norwich : Strawberry 'Boreal Giant' (recommended for trial at Wisley).
- C. Huggins, Esq., Credinghall : Apple seedling.

FRUIT AND VEGETABLE COMMITTEE, OCTOBER 16, 1923.

Mr. C. G. A. Nix, V.M.H., in the Chair, and sixteen members present.

Awards Recommended :—

Silver Hogg Medal.

To O. M. Courage, Esq., Crawley, for collection of Apples.

Silver Knightian Medal.

To Messrs. Sutton, Reading, for vegetables.

Bronze Hogg Medal.

To Messrs. Daniels, Norwich, for Apples and Pears.

To Messrs. E. J. Parsons, Worcester, for Apples and Pears.

Other Exhibits.

F. C. Stoop, Esq., Byfleet : Apple 'Victory.'

Mr. J. Barr, Johnstone, N.B. : Turnip 'Golden Cross.'

Mr. A. H. Walde, Putney : Pear 'Pitmaston Duchess' (weight 1 lb. 14 oz.).

Mr. H. F. Best, Barnes : seedling Apple.

Mr. F. Wood, Knaphill : Apple 'Wood's Scarlet.'

Mr. Woodward, Barham Court Gardens : Apples and Pears.

Messrs. Daniels, Norwich : seedling Apple.

Mr. G. Trinder, Fleet : Raspberry 'Golden Hornet.'

Viscount St. Cyres, Wallhampton : fruit of *Lagenaria vulgaris*, 'Hercules' Club.'

Maj.-Gen. Sir C. F. Hadden, Berkhamstead : Morello Cherries.

FRUIT AND VEGETABLE COMMITTEE, OCTOBER 30, 1923.

Mr. C. G. A. Nix, V.M.H., in the Chair, and thirteen members present.

Awards Recommended :—

Silver-gilt Knightian Medal.

To Messrs. Barr, Covent Garden, for vegetables.

Silver Hogg Medal.

To Messrs. E. J. Parsons, Worcester, for Apples, Pears and Raspberries.

Bronze Hogg Medal.

To Mrs. Reid, Devizes Castle, Wilts., for collection of Grapes, Apples, and Pears.

Bronze Knightian Medal.

To Messrs. Sutton, Reading, for vegetables.

Other Exhibits.

W. Lane, Esq., Cowden, Kent : collection of Apples.

F. J. Lansdell, Esq., Southbourne : seedling Apple.

J. T. Good, Esq., Bushey : Apple 'Bushey Grove.'

J. Davis, Esq., Chippenham : collection of Potatos.

Mr. Woodward, Barham Court Gardens, Kent : Pear 'Doyenne du Comice.'

FRUIT AND VEGETABLE COMMITTEE, NOVEMBER 13, 1923.

Mr. J. CHEAL, V.M.H., in the Chair, and fifteen members present.

Awards Recommended :—

Silver-gilt Hogg Medal.

To Hon. Vicary Gibbs (gr. Mr. Beckett), Aldenham House, for collection of Grapes.

Silver Hogg Medal.

To Messrs. J. Cheal, Crawley, for collection of Apples.

Cultural Commendation.

To Lionel Rothschild, Esq. (gr. Mr. Reynolds), Gunnersbury Park: for forced French Beans 'Tender and True.'

The Apple 'Lord Lambourne,' raised by Messrs. Laxton Bros., was recommended for inclusion in the Commercial Trials of fruit, at Wisley.

The following recommendations made by the Sub-Committee, visiting Wisley to judge the trials of Brussels Sprouts, were confirmed:—

BRUSSELS SPROUTS.

Award of Merit.

'Solidity,' sent by Messrs. Wheeler, Warminster.

'One and All,' sent by Mr. F. C. Heinemann, Erfurt, Germany.

'Darlington,' sent by Messrs. Nutting, 106 Southwark Street, London.

Highly Commended.

'Standard,' sent by Messrs. Barr, 11 King Street, Covent Garden, London.

'Half Long Paris,' sent by Messrs. Toogood, Southampton.

'Walton Dwarf No. 12,' sent by Messrs. W. Rowlands & Co., Childwall Nurseries, Liverpool.

'Walton Dwarf No. 2,' sent by Messrs. W. Rowlands.

Commended.

'Dwarf Selected,' sent by Messrs. Zwaan & de Wiljes, Scheemda, Holland.

'Ideal,' sent by Messrs. Dickson, Brown & Tait, 57 Cross Street, Manchester.

'Early Tall Improved,' sent by Messrs. Zwaan & de Wiljes.

'Walton Dwarf No. 8,' sent by Messrs. W. Rowlands.

'Selected No. 1,' sent by Messrs. G. Cooper, 125 Midland Road, Bedford.

'Selected No. 2,' sent by Messrs. G. Cooper.

'Masterpiece,' sent by Messrs. J. P. Harvey, Kidderminster.

'Early Giant,' sent by Mr. J. L. Clucas, Moor Street, Ormskirk.

Other Exhibits.

Mr. E. Godden, Whyteleafe: Apple 'Mrs. Simmonds.'

Mr. T. MacPhail, Dorchester: Apple 'C. B. Stiby.'

Mr. J. Buchanan, Gargunnock: seedling Potato.

F. C. Stoop, Esq., Byfleet: Apple 'Geo. Carpenter.'

Messrs. Geo. Bunyard, Maidstone: collection of Apples.

Messrs. J. Cheal, Crawley: Apples 'Nanny' and 'Forge.'

FRUIT AND VEGETABLE COMMITTEE, DECEMBER 11, 1923.

Mr. J. CHEAL, V.M.H., in the Chair, and twelve members present.

No awards were recommended on this occasion.

Exhibits.

Messrs. Geo. Bunyard, Maidstone: collection of Apples.

Miss H. G. Sewell, Kensington: Jams and Marmalade.

Messrs. Westmacott, Strand: South African Jams.

Mrs. Miller, Marlow: Preserves.

Miss D. Carter, Peasmash: Jams and Marmalade.

FLORAL COMMITTEE.

JULY 10, 1923.

Mr. H. B. MAY, V.M.H., in the Chair, and sixteen members present.

Awards Recommended :—

Gold Medal.

To Mr. H. J. Jones, Lewisham, for Delphiniums.

Silver-gilt Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

Silver-gilt Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for Delphiniums.

Silver Flora Medal.

To R. J. Arnold, Esq., Streatham, for Caladiums.

To Messrs. Bath, Wisbech, for Delphiniums.

To Messrs. Bunyard, Maidstone, for Roses.

To Messrs. F. Cant, Colchester, for Roses.

To Mr. J. Douglas, Great Bookham, for Border Carnations.

To Messrs. Kelway, Langport, for Delphiniums and Gaillardias.

To Messrs. Ladham, Southampton, for hardy plants.

To Messrs. S. Low, Enfield, for Carnations.

To Messrs. Prichard, Christchurch, for hardy plants.

To Mr. G. Reuthe, Keston, for hardy plants.

To Messrs. Russell, Richmond, for stove plants.

To Mr. Scaplehorn, Beckenham, for hardy plants.

To Messrs. Waterer, Sons & Crisp, Twyford, for hardy plants.

Silver Banksian Medal.

To Messrs. Barr, Taplow, for hardy plants.

To Messrs. Bunyard, Maidstone, for hardy plants.

To Mr. T. Carlile, Twyford, for Delphiniums.

To Messrs. Carter, Raynes Park, for Iceland Poppies.

To Messrs. Carter Page, London, for hardy plants and rock garden.

To Messrs. Cheal, Crawley, for hardy plants and Dahlias.

To Messrs. Cuthbert, Southgate, for Streptocarpus.

To Mr. G. R. Downer, Chichester, for hardy plants.

To Mr. C. Engelman, Saffron Walden, for Carnations.

To Messrs. Lowe & Gibson, Crawley Down, for Gladioli, etc.

To Mr. G. W. Miller, Wisbech, for hardy plants.

To Rev. J. H. Pemberton, Havering-atte-Bower, for Roses.

To Messrs. Skelton & Kirby, Pirbright, for hardy plants.

To Messrs. Sutton, Reading, for Campanulas.

To Messrs. Tucker, Oxford, for hardy plants.

To Mr. W. Wells, jun., Merstham, for hardy plants.

To Mr. F. G. Wood, Ashtead, for hardy plants.

Bronze Flora Medal.

To Mrs. E. P. F. Sutton, Reading, for Carnations.

To Misses Hopkins, Shepperton, for hardy plants.

Award of Merit.

To *Campanula persicifolia* 'Ryburgh Bells' (votes 11 for), from Messrs. Stark, Great Ryburgh. A very fine and vigorous variety producing handsome spikes of large pale blue flowers.

To Carnation 'Mrs. G. R. Groom' (votes 7 for), from Messrs. Groom, Gosport. A perpetual border variety possessing the true old clove scent. It is an exceptionally strong grower and of good habit. Its beautiful salmon-rose flowers have non-splitting calyces, and are of excellent form.

To *Delphinium 'My Lady'* (votes 13 for), from Mr. F. Gifford, Hornchurch. This variety produces fine regular spikes of nicely placed, semi-double, pale lavender-mauve flowers with a cream eye.

To *Delphinium 'Sylph'* (votes 8 for, 3 against), from Mr. F. Gifford, Hornchurch. A good semi-double white variety with a cream eye.

Other Exhibits.

- R. W. Ascroft, Esq., Effingham : *Lonicera japonica aureo-reticulata*.
- Central Garden Supplies, Kenton : hardy plants.
- Mr. W. H. Craven, Harrogate : seedling Pink.
- Mr. E. Dixon, Putney : Campanulas.
- Rt. Hon. Viscount Elveden, Pyrford : *Iris Kaempferi* in variety.
- Messrs. Hewitt, Solihull : *Delphinium 'Advancement'*.
- Messrs. Hopwood, Cheltenham : Petunias.
- Messrs. Rich, Bath : hardy plants.
- Mr. C. Turner, Slough : Dianthus and flowering shrubs.

FLORAL COMMITTEE, JULY 24, 1923.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-three members present.

Awards Recommended :—

Silver-gilt Flora Medal.

- To Messrs. Allwood, Haywards Heath, for Carnations.
- To Mr. H. J. Jones, Lewisham, for Phloxes.
- To Major A. Pam, Broxbourne, for Water Lilies.

Silver-gilt Banksian Medal.

- To Hon. Vicary Gibbs, Elstree, for Scented Pelargoniums.
- To Messrs. Russell, Richmond, for greenhouse plants.

Silver Flora Medal.

- To Donard Nursery, Newcastle, for shrubs, etc.
- To Messrs. Kelway, Langport, for Gladioli.
- To Messrs. Ladham's, Southampton, for hardy plants.
- To Messrs. S. Low, Enfield, for Carnations.
- To Orpington Nursery, Orpington, for Roses.
- To Rev. J. H. Pemberton, Havering-atte-Bower, for Roses.
- To Messrs. Sutton, Reading, for Scabious.
- To Messrs. Waterer, Sons & Crisp, Twyford, for Roses.

Silver Banksian Medal.

- To Messrs. Carter, Raynes Park, for *Trachelium coeruleum*.
- To Mr. C. Engelmann, Saffron Walden, for Carnations.
- To W. R. Portal, Esq., W. Norwood, for Gloxinias.
- To Messrs. Prichard, Christchurch, for hardy plants.
- To Messrs. Prior, Colchester, for Roses.
- To Mr. G. Reuthe, Keston, for hardy plants.
- To Mr. W. Wells, jun., Merstham, for hardy plants.
- To Mr. F. G. Wood, Ashtead, for hardy plants.

Bronze Flora Medal.

- To Mr. T. Carlile, Twyford, for hardy plants.
- To Messrs. Carter Page, London, for alpines and Violas.
- To Mr. G. R. Downer, Chichester, for hardy plants.
- To Mr. A. Edwards, Fordham, for Roses.
- To Messrs. Lowe & Gibson, Crawley Down, for Carnations and Gladioli.

Bronze Banksian Medal.

- To Mr. C. H. Herbert, Birmingham, for Pinks.

Award of Merit.

To *Aristolochia gigantea* (votes 14 for), from the Royal Botanic Gardens, Kew. This very striking and handsome stove climber is a native of Brazil. The large cordate leaves are very ornamental. The big inflated flowers have

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the interior mottled and veined with purple on a cream ground, and unlike those of other members of this genus possess a very pleasant scent.

To *Cladrastis sinensis* (votes unanimous), from the Royal Botanic Gardens, Kew. This interesting Chinese tree was introduced by Mr. E. H. Wilson in 1901. It is deciduous and is of wide-spreading habit, though it reaches a height of about 30 feet when fully grown. Its pinnate leaves consist of 9-15 leaflets, each about 3 inches long and 1 inch wide, dark green and smooth above and glaucous beneath. The fragrant blush-white flowers with a dull golden mark at the base of the standard are borne freely in erect terminal panicles about 8 inches high.

To *Dierama pulcherrimum* 'Heron' (votes 10 for, 3 against), from the Donard Nursery Co., Newcastle. A very striking variety of this graceful plant with deep wine-red flowers.

Other Exhibits.

Messrs. Bees, Chester : Delphiniums.
Major G. Churcher, Lindfield : Gladiolus 'Excelsior.'
Messrs. J. Forbes, Hawick : Pentstemons, Phloxes, etc.
Mr. E. J. Hicks, Twyford : Roses.
Misses Hopkins, Shepperton : hardy plants.
Sir W. Lawrence, Bt., Dorking : *Cooperanthes* 'Sweetheart' and Gladiolus 'L'Argues.'
Messrs. Piper, Langley : hardy plants.
Messrs. Rich, Bath : hardy plants.
Messrs. Skelton & Kirby, Pirbright : hardy plants.
F. C. Stoop, Esq., Byfleet : Carnation 'West Hall Scarlet.'
Messrs. Tucker, Oxford : hardy plants.
W. Turnham, Esq., Henley-on-Thames : Carnation 'The Viscountess Hambledon.'
West View Nurseries, Ipswich : alpines in pots.

FLORAL COMMITTEE, AUGUST 8, 1923.

Mr. H. B. May, V.M.H., in the Chair, and twenty-one members present.

Awards Recommended :—

Gold Medal with special Cultural Commendation.

To Mr. H. J. Jones, Lewisham, for Phloxes.

Silver-gilt Flora Medal.

To Messrs. A. Dickson, Newtownards, for Roses.

To Messrs. Kelway, Langport, for Gladioli.

Silver-gilt Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Bath, Wisbech, for Gladioli.

To Messrs. Cheal, Crawley, for Dahlias and hardy plants.

Silver Flora Medal.

To Messrs. Carter Page, London, for hardy plants.

To Major G. Churcher, Lindfield, for Gladioli.

To Mr. Edwards, Fordham, for Gladioli.

To Messrs. Lowe & Gibson, Crawley Down, for Montbretias and Gladioli.

To Rev. J. H. Pemberton, Havering-atte-Bower, for Roses.

To Messrs. Prichard, Christchurch, for hardy plants.

Silver Banksian Medal.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Mr. H. Marcham, Borough Green, for Scabious.

To Mr. A. Perry, Enfield, for hardy plants.

To Mr. W. Wells, jun., Merstham, for hardy plants.

Bronze Banksian Medal.

To Mr. Klinkert, Richmond, for clipped Box bushes.

To Mr. F. G. Wood, Ashtead, for hardy plants.

Award of Merit.

To *Campanula Hallii* (votes 15 for), from Mr. A. J. Hall, Harrogate. This interesting and useful seedling Campanula is the result of a cross between *C. pusilla alba* and *C. muralis*. The plant is a very free grower and scarcely more than 3 inches high. Its small white bells are borne in great profusion and it is suitable for the rock garden or the alpine house.

Cultural Commendation.

To W. F. Horne, Esq., Woodside, for three pots of a very fine white *Nerium Oleander*.

Other Exhibits.

Messrs. C. Elliott, Stevenage : *Buddleia nanhoensis*.

Miss Evans, Crayford : Carnations.

Mr. W. H. Gardiner, Thorington : *Eschscholtzia 'Robt. Gardiner'*.

Mrs. Homfray, Hampstead : *Anomathea cruenta*.

Lord Lambourne, Romford : *Calceolaria 'Glasgow Beauty'*.

Mr. A. W. Scorgie, Aberdeen : Gladioli.

Messrs. Waterer, Sons & Crisp, Twyford : *Chrysanthemum maximum 'Phyllis Smith.'*

TRIAL OF SWEET PEAS AT WISLEY.

The awards recommended to Sweet Peas after trial at Wisley were confirmed (see p. 71).

FLORAL COMMITTEE, AUGUST 21, 1923.

Mr. H. B. May, V.M.H., in the Chair, and twenty-four members present.

Awards Recommended :—*Silver-gilt Flora Medal.*

To Messrs. Bath, Wisbech, for Gladioli.

Silver-gilt Banksian Medal.

To Major G. Churcher, Lindfield, for Gladioli.

To Messrs. Sutton, Reading, for Montbretias and *Phlox Drummondii*.

Silver Flora Medal.

To Messrs. Carter Page, London, for Dahlias.

To Messrs. Cheal, Crawley, for Dahlias.

To Mr. Edwards, Fordham, for Gladioli.

To Messrs. Kelway, Langport, for Gladioli.

To Rev. J. H. Pemberton, Havering-atte-Bower, for Roses.

To Messrs. Prichard, Christchurch, for hardy plants.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. Chaplin, Waltham Cross, for Roses.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Messrs. House, Bristol, for Scabious.

To Messrs. Lowe & Gibson, Crawley Down, for Gladioli.

To Mr. A. Perry, Enfield, for hardy plants.

To Mr. G. Reuthe, Keston, for hardy plants.

To Mr. W. Wells, jun., Merstham, for hardy plants.

Bronze Flora Medal.

To Mr. F. Gifford, Hornchurch, for Delphiniums.

To Messrs. Prior, Colchester, for Roses.

Bronze Banksian Medal.

To Messrs. Barr, Taplow, for hardy plants.

To Mr. J. Klinkert, Richmond, for clipped Box bushes.

To Messrs. Rich, Bath, for hardy plants.

To Mr. G. G. Whitelegg, Chislehurst, for hardy plants.

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First-class Certificate.

To *Chimaphila maculata* (votes unanimous), from Mr. G. Reuthe, Keston. This uncommon North American plant was introduced in 1762. It grows from four to five inches high, and its evergreen toothed lanceolate leaves are borne in irregular whorls and are variegated with white along the midribs and veins. The pretty white five-petalled flowers are nodding and form a few-flowered umbel. They are about $\frac{1}{2}$ inch wide, and very fragrant.

Award of Merit.

To *Dianthus Allwoodii 'Clarkson Pink'* (votes unanimous), from Mr. G. W. Miller, Wisbech. A large pale soft pink sport from the well-known variety 'Harold.'

To *Montbretia 'Cecil'* (votes 9 for, 2 against), from S. Morris, Esq., Norwich. A yellow-flowered variety of good size and substance, having the individual blooms nicely disposed on the spike.

To *Rose 'America'* (votes unanimous), from Mr. E. J. Hicks, Twyford. An excellent pink Hybrid Tea variety of nice shape and good substance and possessing a very pleasing perfume.

The following Dahlias were selected by the Joint Dahlia Committee for trial at Wisley :—

From Messrs. Cheal, Crawley :

'Haslemere Star' (Star), 'Hindhead Star' (Star), 'Verona' (Min. Paeony).

From Messrs. Jarman, Chard :

'Betty' (Pom.), 'Golden Cup' (Pom.), 'Joyce Goddard' (Cactus), 'Rosie' (Dec.).

From Messrs. Stredwick, St. Leonards-on-Sea :

'A. E. Amos' (Cactus), 'Doris Trayler' (Dec.), 'Gloria' (Dec.), 'Gossamer' (Cactus), 'John W. Woolman' (Cactus), 'Martin' (Cactus), 'Miss Edith L. Jones' (Cactus), 'Periscope' (Cactus).

Other Exhibits.

Mr. H. Borley, Purfleet : *Phlox 'Purfleet Gem.'*

Hon. Vicary Gibbs, Elstree : *Ligustrum Vicarii.*

N. Hadden, Esq., West Porlock : *Lonicera Hildebrandtii* and *Bomarea multiflora*.

Mr. S. A. Lawrenson, Newcastle : *Origanum pulchellum*.

Messrs. Russell, Richmond : greenhouse plants.

FLORAL COMMITTEE, SEPTEMBER 4, 1923.

Mr. H. B. May, V.M.H., in the Chair, and twenty-four members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Carter Page, London, for Dahlias.

To Mr. H. J. Jones, Lewisham, for Phloxes.

Silver-gilt Banksian Medal.

To Messrs. Sutton, Reading, for Montbretias.

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations and *Dianthus Allwoodii*.

To Messrs. Bath, Wisbech, for Gladioli.

To Messrs. Chaplin, Waltham Cross, for Roses.

To Messrs. Cuthbert, Southgate, for *Streptocarpus*, etc.

To Messrs. Kelway, Langport, for Gladioli.

To S. Morris, Esq., D.L., Norwich, for Montbretias.

To Rev. J. H. Pemberton, Havering-atte-Bower, for Roses.

To Messrs. Prichard, Christchurch, for hardy plants.

To Mr. G. G. Whitelegg, Chislehurst, for hardy plants.

Silver Banksian Medal.

To Mr. T. Carlile, Twyford, for hardy plants.
 To Chalk Hill Nurseries, Reading, for hardy plants.
 To Messrs. Cheal, Crawley, for shrubs and Dahlias.
 To Messrs. Dickson, Newtownards, for Roses.
 To Mr. Edwards, Fordham, for Gladioli and Crinums.
 To Messrs. Ladham, Southampton, for hardy plants.
 To Mr. A. Perry, Enfield, for hardy plants.
 To Messrs. Prior, Colchester, for Roses.
 To Messrs. S. Low, Enfield, for Carnations.
 To Mr. W. Wells, jun., Merstham, for hardy plants.
 To Messrs. Wheatcroft, Gedling, for Roses.
 To Mr. Yandell, Maidenhead, for Violas.

Bronze Flora Medal.

To Major G. Churcher, Lindfield, for Gladioli.
 To Mr. C. Engelmann, Saffron Walden, for Carnations.
 To Mr. F. Gifford, Hornchurch, for Delphiniums.
 To Mr. G. W. Miller, Wisbech, for hardy plants.
 To Mr. G. Reuthe, Keston, for hardy plants.
 To Messrs. Rich, Bath, for Phloxes.
 To Mr. F. G. Wood, Ashtead, for hardy plants.

Bronze Banksian Medal.

To Central Garden Supplies, Kenton, for Dahlias, etc.

Other Exhibits.

Blackpill Nurseries, Swansea : Chrysanthemums.
 Messrs. C. Elliott, Stevenage : hardy plants.
 Mr. J. Klinkert, Richmond : clipped Box bushes.
 Mr. F. W. Overill, Boston : Chrysanthemum 'September Yellow.'

JOINT DAHLIA COMMITTEE, SEPTEMBER 5, 1923.

THE DAHLIA SHOW.

The following Dahlias were selected by the Joint Dahlia Committee for trial at Wisley :—

From Messrs. Cheal, Crawley :
 'Defence' (Min. Paeony), 'Nutfield Priory' (Min. Paeony).
 From Mr. A. J. Cobb, Reading :
 'Thomas Ewbank' (Paeony), 'Vive La France' (Paeony).
 From Messrs. Stredwick, St. Leonards-on-Sea :
 'Thos. Want' (Cactus), 'Victory' (Dec.), 'Zebra' (Cactus).
 From Messrs. W. Treseder, Cardiff :
 'Little Jennie' (Single), 'Mrs. Perry' (Coll.).
 From Mr. H. Woolman, Birmingham :
 'Amun Ra' (Dec.).

Dahlias were also submitted by the following :—

Mr. S. E. Faunch, Wadebridge.	Mr. M. Howard, Chesham.
Messrs. Jarman, Chard.	Mr. C. Turner, Slough.

FLORAL COMMITTEE, SEPTEMBER 18, 1923.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-four members present.

Awards Recommended :—*Gold Medal.*

To Mr. H. J. Jones, Lewisham, for Dahlias.

Silver-gilt Banksian Medal.

To Messrs. Artindale, Sheffield, for Gladioli and Violas.
 To Messrs. Bath, Wisbech, for Gladioli and Delphiniums.
 To S. Morris, Esq., Norwich, for Montbretias.

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations and *Dianthus Allwoodii*.

To Messrs. Carter Page, London, for Dahlias.

To Mr. T. Carlile, Twyford, for Delphiniums.

To Messrs. Carter, Raynes Park, for Lilliums.

To Messrs. Cheal, Crawley, for Dahlias.

To Messrs. Harkness, Bedale, for hardy plants.

To Messrs. House, Bristol, for Scabious.

To Messrs. Kelway, Langport, for Gladioli.

To Messrs. Lowe & Gibson, Crawley Down, for Gladioli.

To Messrs. Paul, Waltham Cross, for Roses.

To Rev. J. H. Pemberton, Havering-atte-Bower, for Roses.

To Mr. J. T. West, Brentwood, for Dahlias.

To Messrs. Wheatcroft, Gedling, for Roses.

Silver Banksian Medal.

To Mr. E. Ballard, Colwall, for Michaelmas Daisies.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Messrs. Maxwell & Beale, Broadstone, for alpines.

To Messrs. Prichard, Christchurch, for hardy plants.

To Mr. J. B. Riding, Chingford, for Dahlias.

To Messrs. Russell, Richmond, for Clematis.

To Mr. C. Turner, Slough, for Dahlias.

To University College, Reading, for Dahlias.

To Mr. W. Wells, jun., Merstham, for hardy plants.

To Mr. G. G. Whitelegg, Chislehurst, for hardy plants.

To Mr. H. Woolman, Birmingham, for Dahlias and Chrysanthemums.

To Mr. F. G. Wood, Ashtead, for hardy plants.

To Mr. Yandell, Maidenhead, for Violas.

Bronze Flora Medal.

To Messrs. Cutbush, Barnet, for Pentstemons and Michaelmas Daisies.

To Mr. Edwards, Fordham, for Gladioli.

To Messrs. Reamsbottom, West Drayton, for Anemones.

To Messrs. S. Low, Enfield, for Roses and Carnations.

Award of Merit.

To Kniphofia 'Royal Standard' (votes 14 for), from Messrs. Prichard, Christchurch. This valuable addition to our hardy border plants produces spikes of medium size, having the unopened buds of the upper portion bright coral red and the fully open flowers of the lower half bright yellow. This variety is said to remain attractive over a long season. Its height is 3 feet.

To Montbretia 'Jessie' (votes unanimous), from S. Morris, Esq., D.L., Norwich. This beautiful variety is the result of a cross between the varieties 'Sunshine' and 'Pocahontas.' Its medium-sized flowers are of an orange shade tinged with pink, while the centre is yellow.

To Montbretia 'The Princess' (votes unanimous), from S. Morris, Esq., D.L., Norwich. A large orange-red variety with a yellow zone in the interior of the flower. The centre is surrounded by crimson spots. This variety is the result of a cross between 'G. Henley' and 'Queen Alexandra.'

To Pyrus *earlhamensis* (votes unanimous), from S. Morris, Esq., D.L., Norwich. Handsome both in flower and fruit, this beautiful Pyrus is thought to be the result of a cross between a garden variety of Apple and *Pyrus Niedzwetzkyana*, the latter being the seed parent. On the present occasion it was shown in fruit. The fruits are large and dark crimson. This colour is also evident in the flesh, which is very pleasant to eat.

The awards recommended to Dahlias after trial at Wisley were confirmed (see p. 62).

The following Dahlias were selected by the Joint Committee for trial at Wisley :—

From Messrs. Burrell, Cambridge :

'Emblem' (Dec.), 'Emily' (small Paeony), 'Gwynne' (small Dec.),
'Sylph' (Paeony), 'Thursa' (small Dec.), 'Violetta' (Paeony).

From Mr. W. Y. Challingsworth, Coventry :

'Mrs. W. Y. Challingsworth' (Coll.).

From Messrs. Cheal, Crawley :
 'Nero' (Pompon).

From Mr. A. J. Cobb, University College, Reading :
 'Reading Star' (Star).

From Hon. Vicary Gibbs, Elstree :
 'Polar Bear' (Dec.)

From Mr. H. Shoesmith, Woking :
 'Lenny' (Dec.), 'Winnie Hardy' (Cactus).

From Messrs. Stredwick, St. Leonards-on-Sea :
 'Beacon' (Dec.), 'Dot' (Min. Coll.), 'L. Hancock' (Dec.), 'Lucien' (Dec.), 'Magpie' (Dec.), 'Mrs. E. G. Cant' (Dec.), 'Phosphorus' (Single), 'Rector' (Dec.), 'Rocket' (Cactus), 'Vera' (Dec.).

From Mr. C. Turner, Slough :
 'Lydia' (Star).

Other Exhibits.

Central Garden Supplies, Kenton : hardy plants.

Major G. Churcher, Lindfield : Gladioli.

Mr. A. S. Dunton, Wolverhampton : *Aucuba japonica crotonifolia*.

Mr. Klinkert, Richmond : clipped Box bushes.

C. J. Lucas, Esq., Horsham : *Itea ilicifolia*, A.M., 1911.

C. T. Musgrave, Esq., Godalming : *Fuchsia 'L'Enfant Prodigue'*.

Mrs. E. Dickson Park, Flackwell Heath : Verbascum for naming—referred to Scientific Committee.

Rev. B. Pinney, Durweston : Violets, etc.

Messrs. Rich, Bath : hardy plants.

Messrs. Thyne, Dundee : *Chrysanthemum 'Mary Colvin'*.

Messrs. Veitch, Exeter : flowering shrubs.

Mr. H. Vigers, Dartford : hardy plants.

FLORAL COMMITTEE, OCTOBER 2, 1923.
 AT HOLLAND PARK SKATING RINK.

Mr. H. B. MAY, V.M.H., in the Chair, and thirty members present.

Awards Recommended :—*Award of Merit.*

To *Aster 'Snowdrift'* (votes 12 for, 2 against), from Mr. E. Ballard, Colwall. A new dwarf mid-season variety with large snow-white semi-double flowers.

To *Berberis × 'Autumn Beauty'* (votes unanimous), from The Director, R.H.S. Gardens, Wisley. This is a seedling from *B. × rubrostilla*. Its erect twiggy growths bear clusters of brilliant coral-red conical fruits flattened at the base and top and measuring about $\frac{1}{2}$ of an inch long.

To *Buddleia 'Golden Glow'* (votes unanimous), from W. van de Weyer, Esq., Corfe Castle. This interesting hybrid was raised as the result of crossing *B. globosa* ♀ and *B. magnifica* ♂. Its flowers are borne in rounded heads like those of *B. globosa*, but the colour is orange and yellow, tinted with pink and mauve.

To *Buddleia 'Moonlight'* (votes unanimous), from W. van de Weyer, Esq., Corfe Castle. This hybrid, which is of the same origin as the above, has light creamy-coloured flowers with deep orange throats.

To *Chrysanthemum 'Doreen Woolman'* (votes unanimous), from Mr. H. Woolman, Shirley, Birmingham. A single garden variety of a bronzy-apricot colour.

To *Chrysanthemum 'Minstrel'* (votes 13 for), from Mr. H. Woolman, Shirley, Birmingham. A good double garden Chrysanthemum of a deep Burgundy-crimson colour.

To *Chrysanthemum 'Mrs. Jack Pearson'* (votes 13 for, 1 against), from Mr. P. Ladds, Swanley Junction. This variety is remarkable for its long season of flowering, which commences in the middle of July and continues till frosts close it. The flowers, which measure from $3\frac{1}{2}$ to 4 inches across, are of an amber colour faintly flushed with terracotta. They are borne on good stems, and the height of the plant is from $2\frac{1}{2}$ to 3 feet.

To *Chrysanthemum 'Royal Salute'* (votes 21 for), from Mr. H. Woolman, Shirley, Birmingham. An early-flowering double garden variety of a reddish terracotta shade.

To *Gladiolus 'Palestine'* (votes 12 for), from Messrs. Kelway, Langport. A very fine deep cream variety with a large reddish-brown blotch.

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To *Ligustrum Quihoui* 'Tree Form' (votes 17 for), from Hon. Vicary Gibbs (gr. Mr. E. Beckett), Elstree. A tree form of this beautiful Chinese shrub. The white sessile flowers are borne in small clusters forming long panicled spikes at the end of the branches. The dark green leaves are narrow and oblong and measure from 1 to 2 inches in length.

The following Dahlias were selected by the Joint Committee for trial at Wisley :

From Messrs. Burrell, Cambridge : 'Carine' (small Dec.) ; 'Defoe' (Dec.) ; 'Iona' (Dec.) ; 'Kitty' (Min. Peony) ; 'Velma' (small Dec.).

Other Exhibits.

Mr. W. G. Baker, Oxford : Aster 'Violet Baker.'

Messrs. F. Cant, Colchester : Roses.

Mr. T. Carlile, Twyford : *Clematis heracleifolia* 'Columbine.'

Messrs. Cheal, Crawley : *Berberis Thunbergii splendens* and Dahlias.

Major G. Churcher, Lindfield : Gladioli.

Donald Nursery Co., Newcastle : yellow-fruited *Cotoneaster frigida*.

Messrs. Jackman, Woking : Kniphofia 'Sunshine.'

Messrs. Maxwell & Beale, Broadstone : *Erica hybrida* 'Dawn.'

S. Morris, Esq., D.L., Norwich : Montbretia 'Cleopatra.'

Mrs. D. H. Moutray Read, Wadhurst : *Vitis* sp.

L. de Rothschild, Esq., Acton : Buddleia 'Kingdon Ward 5000.'

Messrs. Simmonds, Kings Langley : Asters.

Mr. F. G. Wood, Ashtead : Aster 'Kate Bloomfield.'

FLORAL COMMITTEE, OCTOBER 16, 1923.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-eight members present.

Awards Recommended :—

Gold Medal.

To Hon. Vicary Gibbs (gr. Mr. E. Beckett), Elstree, for berried shrubs and autumn foliage.

Silver-gilt Flora Medal.

To Mr. H. J. Jones, Lewisham, for Asters.

Silver-gilt Banksian Medal.

To Mr. A. Perry, Enfield, for Scolopendriums.

To Mr. J. B. Riding, Chingford, for Dahlias.

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Mr. E. Ballard, Colwall, for Asters.

To Messrs. Chaplin, Waltham Cross, for Roses.

To Messrs. House, Bristol, for Scabious.

To Messrs. Kelway, Langport, for Gladioli.

To Messrs. Ladham, Southampton, for hardy plants.

To Messrs. Luxford, Harlow, for Chrysanthemums.

To Rev. J. H. Pemberton, Havering-atte-Bower, for Roses.

To Mr. C. Turner, Slough, for Dahlias.

To Messrs. Waterer, Sons & Crisp, Twyford, for Asters.

To Mr. J. T. West, Brentford, for Dahlias.

Silver Banksian Medal.

To Messrs. Baker, Codswall, for hardy plants.

To Messrs. Barr, Taplow, for Nerines and Asters.

To Messrs. F. Cant, Colchester, for Roses.

To Messrs. Cheal, Crawley, for Asters.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Messrs. Godfrey, Exmouth, for Chrysanthemums.

To Mr. E. J. Hicks, Twyford, for Roses.

To Messrs. S. Low, Enfield, for Carnations.

To Messrs. Carter Page, London, for Asters.

To Mr. W. Wells, jun., Merstham, for Asters.

To Mr. F. G. Wood, Ashtead, for Asters.

Bronze Flora Medal.

To Messrs. Cutbush, Barnet, for Asters.

To Major-Gen. Sir Charles Hadden, Berkhamstead, for Pelargoniums.

To Mr. G. W. Miller, Wisbech, for Asters.

Bronze Banksian Medal.

To Misses Allen-Brown, Henfield, for Violets.

To Messrs. Reamsbottom, West Drayton, for Anemones.

To Mr. Vigers, Green Street Green, for hardy plants.

Award of Merit.

To Aster 'Aldenham Pink' (votes 16 for), from Hon. Vicary Gibbs, Elstree.

A variety of the Novi Belgii section with large bluish-rose flowers.

To Aster 'October Dawn' (votes 13 for, 2 against), from Mr. E. Ballard, Colwall. Another variety of the Novi Belgii section with large lilac-mauve flowers measuring 1½ inch across.

To *Berberis brachypoda Gibbsii* (votes 19 for), from Hon. Vicary Gibbs (gr. Mr. Beckett), Elstree. This erect-growing, very spiny Berberis bears long well-furnished bunches of bright red berries which are very attractive and graceful. The leaves are oblanceolate in shape.

To *Berberis 'Tom Thumb'* (votes 19 for), from S. Morris, Esq., D.L. (gr. Mr. Pitt), Norwich. This is a dwarf Berberis not more than a foot high and of very dense bushy habit. It bears round coral-red berries somewhat like those of *B. Wilsonae*. It is said to be the result of a cross between *B. aggregata* and *B. Wilsonae*, and by reason of its habit it should prove extremely useful for the rock garden. The plants exhibited were stated to be seven years old, but they were easily accommodated in a medium-sized pan.

To Chrysanthemum 'Elsie' (votes 7 for), from Mr. G. Carpenter, Byfleet. A large yellow Japanese exhibition variety with long, broad florets.

To Chrysanthemum 'Godfrey's Gem' (votes 10 for, 3 against), from Messrs. Godfrey, Exmouth. A single variety of excellent form and of a brilliant orange-buff colour.

To *Pyrus Aucuparia munda subarachnoidea* (votes 15 for), from Hon. Vicary Gibbs, Elstree. This beautiful Mountain Ash bears bunches of round white berries which are very attractive.

To *Scolopendrium vulgare muricatum fimbriatum capitatum* (votes 7 for, 2 against), from Mr. A. Perry, Enfield. This interesting variety of a well-known hardy native fern has long, erect, crisped fronds with tasselled crests.

To *Scolopendrium vulgare ramo-crispissimum conglomeratum* (votes 10 for), from Mr. A. Perry, Enfield. This is a curious dense dwarf form with short, broadened, crisped and crested fronds.

The following Dahlias were selected by the Committee for trial at Wisley :

From Mr. A. J. Cobb, Reading : 'Sweet' (Min. Peony).

From Messrs. Ladhams, Southampton : 'Attractive' (Bedding).

Other Exhibits.

Lady Aberconway and Hon. H. D. McLaren, Bodnant : *Nerine 'Red Admiral.'*

Miss M. A. Austen, Broadstairs : *Helianthus rigidus 'Stella D'Or.'*

Mr. W. F. Gullick, Salisbury : Chrysanthemums.

Misses Hopkins, Shepperton : hardy plants.

Mr. Klinkert, Richmond : clipped box trees.

Messrs. Lowe & Gibson, Crawley Down : Gladioli.

Rev. B. Pinney, Durweston : Violets.

Messrs. Rich, Bath : hardy plants.

Messrs. Simmonds, Kings Langley : Aster 'Little Jim.'

F. J. Strover, Esq., South Norwood : *Amaryllis Brunsvigia Josephinae*.

The following awards recommended to Dwarf Tropaeolums on trial at Wisley were confirmed :

Award of Merit.

27. 'Fireball,' sent by Messrs. Nutting.

Highly Commended.

39. 'Empress of India,' sent by Messrs. Carter.

FLORAL COMMITTEE, OCTOBER 30, 1923.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-five members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Mr. H. J. Jones, Lewisham, for Chrysanthemums.

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Col. H. C. Elwes, D.S.O., Colesborne, for Nerines.

To Messrs. Luxford, Harlow, for Chrysanthemums.

To Rev. J. H. Pemberton, Havering-atte-Bower, for Roses.

To Messrs. L. R. Russell, Richmond, for stove plants.

To Mrs. Sofer Whitburn, Amport St. Mary's, for Begonias.

Silver Banksian Medal.

To Messrs. Baker, Codswall, for hardy plants.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Messrs. Godfrey, Exmouth, for Chrysanthemums.

To Messrs. Carter Page, London, for Chrysanthemums.

To Messrs. Wheatcroft, Gedling, for Roses.

To Mr. Yandell, Maidenhead, for Chrysanthemums.

Bronze Flora Medal.

To Rev. B. Pinney, Durweston, for Violets.

Bronze Banksian Medal.

To Messrs. House, Bristol, for Scabious.

To Mr. J. J. Kettle, Corfe Mullen, for Violets.

To Mr. F. G. Wood, Ashtead, for hardy plants.

Award of Merit.

To *Berberis × 'Comet'* (votes unanimous), from The Director, R.H.S. Gardens, Wisley. A very fine seedling raised at Wisley, producing long arching growths which are thickly crowded with round coral-red berries.

To *Buddleia auriculata* (votes 18 for, 1 against), from the Royal Botanic Gardens, Kew. This beautiful South African shrub is of loose and graceful habit. Its small pale cream flowers with slender downy tubes are crowded in short axillary and terminal panicles and diffuse a strong and very pleasing Primrose-like fragrance. The lanceolate leaves are dark green above and grey below. The plant is somewhat tender but is a free grower, reaching a height of ten feet or more, and it succeeds well within the shelter of a wall at Kew and in the garden of Mr. R. Cory at Duffryn, Cardiff.

To *Chrysanthemum 'Exmouth Pink'* (votes 10 for, 1 against), from Messrs. Godfrey, Exmouth. A good rose-pink single variety.

To *Chrysanthemum 'Golden Marvel'* (votes 15 for), from Mr. G. Carpenter, Byfleet. The flowers of this rich golden-bronze Decorative variety are very full and of nice form.

To *Chrysanthemum 'Mr. E. Reeves'* (votes 13 for), from Mr. G. Carpenter, Byfleet. A very full-flowered golden-yellow Decorative variety.

To *Chrysanthemum 'Mrs. T. Hancock'* (votes 10 for, 5 against), from Messrs. Godfrey, Exmouth, and Messrs. Luxford, Harlow. A very large pale buff single variety flushed with pink. This colour combination is uncommon and very pleasing. The variety is a sport from 'Mrs. W. F. Godfrey.'

To *Chrysanthemum 'Nona'* (votes 6 for), from Messrs. Luxford, Harlow. A good white single variety with several rows of florets.

To *Chrysanthemum 'Raleigh'* (votes unanimous), from Messrs. Godfrey, Exmouth. A dark crimson single with a golden centre surrounded with a very narrow band of bright yellow.

To *Nerine 'White Knight'* (votes 6 for), from Messrs. Barr, Taplow. A large white variety with a central streak of pink. The petals are also flushed with pink on the outside. The inflorescence exhibited had eleven open flowers and buds.

Other Exhibits.

Mrs. Brocklehurst, Winchcombe : Nerines.
 Mr. F. Down, Lewes : Chrysanthemum 'White Eddy' and three seedling *Amaryllis* × *Clivia miniata*.
 Hon. Vicary Gibbs, Elstree : Asters.
 Viscount Hambledon, Henley-on-Thames : Chrysanthemums.
 Mr. E. J. Hicks, Twyford : Rose 'America.'
 Misses Hopkins, Shepperton : paved garden.
 Messrs. Hurst, Houndsditch : Primula 'Eureka Salmon Pink.'
 Jonkheer de Jonge, Esq., Stoke D'Abernon : *Polyodium appendiculatum*.
 Mr. Klinkert, Richmond : clipped trees.
 Sir William Lawrence, Bt., Burford : *Erlangea tomentosa* from the open.
 Messrs. Lowe & Gibson, Crawley Down : Gladioli.
 Mr. A. Perry, Enfield : Lobelia 'Huntsman.'
 Mr. W. Peters, Leatherhead : Aster 'Kate Bloomfield.'
 Messrs. Wallace, Tunbridge Wells : *Schizostylis coccinea* 'Mrs. Hegarty.'

FLORAL COMMITTEE, NOVEMBER 13, 1923.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-four members present.

Awards Recommended :—*Silver-gilt Flora Medal.*

To Messrs. Wells, Merstham, for Chrysanthemums.

Silver-gilt Banksian Medal.

To Messrs. Barr, Taplow, for Nerines.

Silver Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Mr. E. H. Causer, Chingford, for greenhouse plants.

To Messrs. Luxford, Harlow, for Chrysanthemums.

Silver Banksian Medal.

To Mr. J. J. Kettle, Corfe Mullen, for Violets.

To Messrs. S. Low, Enfield, for Carnations.

To the Orpington Nurseries, for conifers.

To Mr. G. Reuthe, Keston, for hardy plants.

To Messrs. Russell, Richmond, for shrubs.

To Mr. G. G. Whitelegg, Chislehurst, for conifers, shrubs and Primulas.

Bronze Flora Medal.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Miss Heathcote, Williton, for Violets.

To Mr. Klinkert, Richmond, for clipped trees.

Bronze Banksian Medal.

To Mr. F. G. Wood, Ashtead, for hardy Chrysanthemums.

Award of Merit.

To Chrysanthemum 'Miss Joyce Moore' (votes 16 for), from Mr. G. Carpenter, Byfleet. A large bright crimson-scarlet single variety with several rows of florets. There is a bright yellow zone round the eye.

To Chrysanthemum 'Mrs. J. Palmer' (votes 13 for), from Mr. G. Carpenter, Byfleet. A large white single variety with several rows of florets.

To Chrysanthemum 'Norman' (votes 12 for), from Mr. G. Carpenter, Byfleet. A golden-yellow single with several rows of broad florets slightly re-curved.

To Chrysanthemum 'Pink Beauty' (votes 8 for, 3 against), from Mr. G. Carpenter, Byfleet. A very large rose-pink single with several rows of florets and a white ring round the eye.

To Chrysanthemum 'Radiant' (votes 7 for, 3 against), from Mr. H. J. Jones, Lewisham. A good golden-bronze Decorative variety of nice form and medium size.

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Other Exhibits.

Messrs. Baker, Codsall : hardy plants.
Messrs. Cheal, Crawley : *Salix Bockii*.
Mr. A. Deadman, Forest Row : Chrysanthemum 'Mrs. A. Deadman.'
Mr. E. J. Hicks, Twyford : Rose 'America.'
Misses Hopkins, Shepperton : hardy plants.
Mrs. Lucas, Wantage : Violets.
Mr. L. Mills, Welling : Chrysanthemum 'November Pink.'
S. Morris, Esq., D.L., Norwich : Berberis.
Mr. B. Nash, Sutton : Chrysanthemum 'Hilda Forster.'
Rev. B. Pinney, Durweston : Violets.
Mr. A. Robertson, St. John's Wood : Chrysanthemum 'Mrs. F. J. Yarrow.'
Mr. H. Shoesmith, Woking : Chrysanthemums.
Mr. T. Stevenson, Cowley : Chrysanthemum 'Bernard Hicks.'
Mr. A. Ward, Farnham : Chrysanthemums.
Miss I. E. Wright, Kew : *Ornithogalum lacteum* and *O. thyrsoides*, flowers sent in cold storage from S. Africa.

FLORAL COMMITTEE, NOVEMBER 27, 1923.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-one members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To J. B. Body, Esq. (gr. Mr. C. Hay), Hindhead, for Begonias.

Silver Flora Medal.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Messrs. Luxford, Harlow, for Chrysanthemums.

To Messrs. Wells, Merstham, for Chrysanthemums.

Silver Banksian Medal.

To Countess Cawdor, Haslemere, for *Pernettya mucronata* in variety.

To Mrs. Constance Joy, Bentley, for Begonias and Chrysanthemums.

To Messrs. S. Low, Enfield, for Carnations.

To Mr. G. Reuthe, Keston, for Conifers.

To Mr. S. Smith, Enfield, for Cacti and other succulent plants.

Bronze Flora Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.

To Messrs. L. R. Russell, Richmond, for shrubs.

Bronze Banksian Medal.

To the French Intensive Gardens, Croydon, for a collection of everlasting flowers and grasses.

Other Exhibits :—

Mrs. Ashley, Romsey : Chrysanthemum 'Mrs. Wilfred Ashley.'

Messrs. Baker, Codsall : Chrysanthemums.

Mr. G. Barrell, Walton : Chrysanthemum 'George Barrell.'

Mr. J. R. Batty, Skelton-in-Cleveland: seedling P. F. Carnation 'Winsome Harton.'

Mr. G. Carpenter, Byfleet: Chrysanthemum 'Chestnut Glory.'

Messrs. H. Chapman, Rye : Nerine 'J. T. Bennett-Poë'

Mr. J. D. Hay, Bury St. Edmunds: *Richardia aethiopica* 'Beyton Purity.'

Misses Hopkins, Shepperton : hardy plants.

Mr. Klinkert, Richmond : clipped box trees.

Mr. H. Shoesmith, Woking : Chrysanthemums.

R. Chetwynd Stapylton, Esq., Great Berkhamstead : Begonia 'Woodcock Hill.'

Mr. J. Thorne, Haslemere : Chrysanthemums.

Messrs. W. Treseder, Cardiff : Chrysanthemum 'Lady D. R. Llewellyn.'

Messrs. Carlton White, London : wreath of foliage and fruit.

Mr. F. G. Wood, Ashtead : Chrysanthemums.

FLORAL COMMITTEE, DECEMBER 11, 1923.

Mr. H. B. May, V.M.H., in the Chair, and twenty-two members present.

Awards Recommended :—*Silver Flora Medal.*

To Messrs. S. Low, Bush Hill Park, for Carnations.
To Messrs. Luxford, Harlow, for Chrysanthemums.

Silver Banksian Medal.

To Messrs. Allwood, Haywards Heath, for Carnations.
To Mr. C. Engelmann, Saffron Walden, for Carnations.
To the Orpington Nurseries, Orpington, for evergreen shrubs.
To Messrs. L. R. Russell, Richmond, for hardy shrubs.
To Messrs. Sutton, Reading, for Chrysanthemums.

Bronze Flora Medal.

To the French Intensive Gardens, Croydon, for everlasting grasses and flowers.

Bronze Banksian Medal.

To Messrs. Scott & Wickham, Witley, for Chrysanthemum 'Golden Butterfly.'
To Mr. S. Smith, Enfield, for succulent plants.

Award of Merit.

To Chrysanthemum 'Brightness' (votes 21 for), from Mr. H. W. Thorpe,
High Salvington, Worthing. A very bright rose-pink Decorative variety with
a silvery reverse. It is evidently a very useful variety for producing sprays.

Other Exhibits.

Mr. S. Aish, Dunstable : Chrysanthemum 'Cuerdon Sunflower.'
Messrs. Baker, Wolverhampton : hardy plants.
The Countess of Chichester, Lewes : Primula 'Stanmer Seedling.'
Mr. Klinkert, Richmond : Clipped Box trees.
Mr. H. Shoesmith, Woking : Chrysanthemums.
Mr. F. G. Wood, Ashtead : alpines and Chrysanthemums.

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ORCHID COMMITTEE.

JULY 10, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and ten members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Stuart Low, Jarvisbrook, for a group.

Award of Merit.

To *Vuylstekeara × insignis picta* (*Miltonia × Bleuana × Odontioda × Charlesworthii*) (votes 7 for, 1 against), from Messrs. Charlesworth. The spike bore eighty-four flowers with violet-purple sepals and petals edged and tipped with white, and white lip with rose-purple base.

Other Exhibits.

Messrs. Charlesworth : *Miltonia* crosses.

Messrs. Sanders : *Stanhopea tigrina*, etc.

Messrs. Cowan : *Laeliocattleya × 'Murillo'* (*L.-c.* × '*Rubens*' × *C.* × '*Empress Frederick*').

ORCHID COMMITTEE, JULY 24, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and eleven members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Stuart Low, Jarvisbrook, for hybrids and species.

Cultural Commendation.

To Messrs. Armstrong & Brown, Tunbridge Wells, for white *Odontoglossum perculatum album* with a nine-branched spike of fifty-nine flowers.

Other Exhibits.

Dr. Miguel Lacroze : *Brassocattleya × 'Santiago del Estero'* (*B.-c.* × *Digbyano-mendelii* × *C.* × *Hardyana*).

Pantia Ralli, Esq. : *Odontioda × 'Eclipse.'*

H. T. Pitt, Esq. : *Odontoglossum × 'Purple Emperor,' Pitt's var.*

Messrs. Sanders : *Odontoglossums* and rare species.

Messrs. Armstrong & Brown : *Cattleya × Hardyana*, home-raised.

ORCHID COMMITTEE, AUGUST 8, 1923.

The Hon. H. D. McLaren in the Chair, and nine members present.

Award Recommended :—

Vote of Thanks.

To Messrs. Cowan, Southgate, for a selection of showy hybrids.

Other Exhibit.

Messrs. Cowan : *Laeliocattleya × 'Nanon'* (*L.-c.* × '*Ivanhoe*' × *C. Dowiana aurea*).

ORCHID COMMITTEE, AUGUST 21, 1923.

FREDERICK J. HANBURY, Esq., F.L.S., in the Chair, and twelve members present.

Awards Recommended :—*Vote of Thanks.*

To Messrs. Flory & Black, Slough, for hybrid Cattleyas.

To Messrs. Sanders, for *Cypripedium Godefroyae punctatissimum*, a good white flower with spotted lines of claret-purple.

ORCHID COMMITTEE, SEPTEMBER 4, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and nine members present.

Awards Recommended :—*Silver Banksian Medal.*

To Messrs. Stuart Low, Jarvisbrook, for showy species and hybrids.

Vote of Thanks.

To J. J. Bolton, Esq., Claygate Lodge, Claygate, for Cattleyas and Laeliocattleyas.

Award of Merit.

To *Brassolaeliocattleya* × 'Tucuman,' Claygate Lodge var. (*C. × Rhoda* × *B.-l.-c. × Cooksonii*) (votes unanimous), from J. J. Bolton, Esq. Flowers of good shape, sepals and petals gold colour with a slight bronze shade, lip broad, crimped at the edge, reddish-purple with gold lines.

To *Laeliocattleya* × 'Mrs. Medo,' Low's var. (*C. × Venus* × *L.-c. × luminosa*) (votes unanimous), from Messrs. Stuart Low. Flowers nearest to the Laeliocattleya parent, chrome-yellow with claret-purple lip.

Cultural Commendation.

To Messrs. Armstrong & Brown, Tunbridge Wells, for a fine specimen of *Cattleya × Iris magnifica* which had been in the collection fifteen years and frequently used for seed-bearing.

Other Exhibits.

Messrs. Armstrong & Brown: *Laeliocattleya* × 'Golden Wren' (*C. iridescens* × *L.-c. × 'Thyne'*) and other yellow hybrids, and a selection of rare species.

Messrs. Stuart Low: *Sophronitis* crosses.

ORCHID COMMITTEE, SEPTEMBER 18, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and twelve members present.

Awards Recommended :—*Silver Flora Medal.*

To Messrs. Sanders, St. Albans, for hybrids and rare species.

Silver Banksian Medal.

To H. T. Pitt, Esq., Rosslyn, Stamford Hill, for a group.

To Messrs. Stuart Low, Jarvisbrook, for Cattleyas and Laeliocattleyas.

Award of Merit.

To *Cypripedium Godefroyae leucoxilium*, Gatton Park var. (votes 8 for), from Sir Jeremiah Colman, Bt. Flower in colour approaching *C. bellatulum*, white, heavily marked with claret-red, lip white.

To *Laeliocattleya* × 'Aureole' var. 'Renown' (*C. × Iris* × *L.-c. × luminosa*) (votes unanimous), from Pantia Ralli, Esq., Ashtead Park. Sepals and petals bright yellow, lip ruby purple with yellow disc.

To *Vuystekarea* × 'Medea' (*Oda.* × 'Zenobia' × *Miltonia* × *Charlesworthii*) (votes 10 for), from Messrs. Charlesworth. A seedling plant with two flowers shaped like Miltonia. Sepals and petals dark purple, lip blush-white spotted with purple.

Other Exhibits.

Sir Jeremiah Colman, Bt.: basket of *Spathoglottis* × *zebrina* (*Fortunei* × *plicata*) with over forty spikes chiefly with yellow flowers, but one white and others rose as in *S. plicata*.

Messrs. Charlesworth: Cattleyas.

Messrs. Cowan: Cattleyas and Brassocattleyas.

ORCHID COMMITTEE, OCTOBER 2, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and twenty-two members present.

Awards Recommended:—

First-class Certificate.

To *Laeliocattleya* × 'Marina' *majestica* (*C.* × *Hardiana* × *L.-c.* × 'St. Gothard') (votes unanimous), from Messrs. Cowan, Southgate. Flower nearest to the Laeliocattleya parent, large, bright rosy-mauve with ruby-crimson lip.

Award of Merit.

To *Brassolaeliocattleya* × *maculata*, the Dell var. (*B.-l.-c.* × 'The Baroness' × *L.-c.* × 'Thyone') (votes 16 for), from Baron Bruno Schröder, The Dell Park, Englefield Green. An improvement on the original form flowered in 1920. Flowers light yellow with mottled rose markings on the lip.

To *Cattleya* × 'Aeneas' var. 'Goliath' (*Dowiana aurea* × 'Venus') (votes 16 for), from Messrs. Cowan. A well-formed bright yellow hybrid with rose-crimson front to the lip.

To *Sophrolaeliocattleya* × 'His Majesty' var. 'Flammea' (*S.-l.-c.* × 'Marathon' × *C. Trianae Backhouseana*) (votes 14 for, 3 against), from Messrs. Charlesworth, Haywards Heath. Flowers resembling those of the *C. Trianae* parent, rosy-mauve with a gold shade. Lip ruby-crimson.

To *Laeliocattleya* × 'Mrs. Medo' var. 'Sovereign' (*C.* × 'Venus' × *L.-c.* × *luminosa*) (votes unanimous), from Messrs. Stuart Low, Jarvisbrook. The third of the cross to receive an Award of Merit. Sepals and petals bright yellow, lip reddish-purple, the broad front lobe being on a narrowed middle.

To *Cattleya* × 'Tagus' var. 'Cupid' ('Rhoda' × 'King George') (votes unanimous), from Messrs. Flory & Black, Slough. A finely formed flower and clear yellow with crimson lip.

Other Exhibits.

Messrs. Charlesworth: white Phalaenopsis, etc.

Messrs. Stuart Low: Cattleyas and Laeliocattleyas.

Messrs. Flory & Black, Slough: hybrids.

Messrs. Mansell & Hatcher, Rawdon: group Miltonias.

H. T. Pitt, Esq.: *Cattleya* × 'Prince Shimadzu,' with five flowers on a spike, and *Brassocattleya* × 'Penelope.'

A. M. Gentle, Esq., St. Albans: *Laeliocattleya* × 'Edith Gentle' (*L.-c.* × 'Miss Louisa Fowler' × *C. Hardiana*) and *Pleione Wallichiana*.

ORCHID COMMITTEE, OCTOBER 16, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, Vicomte Sohma of Japan, and sixteen members present.

Awards Recommended:—

Silver Banksian Medal.

To Messrs. Cowan, Southgate, for a selection of Cypripediums and Cattleyas.

First-class Certificate.

To *Cypripedium* × 'Albion,' Bodnant var. (*niveum* 'Goliath' × 'Astarte') (votes 10 for), from Lady Aberconway and Hon. H. D. McLaren. A fine white flower with a few minute purple dots on the petals. *C. insigne Sanderae* and *C. bellatulum* are in the combination, but *C. niveum* enlarged predominates to the exclusion of the colour in other species.

To *Cattleya* × 'Mrs. Gratrix' ('Lady Veitch' × *intertexta Juliettae*) (votes 12 for), from Messrs. Sanders. Both parents are albinos and the resultant hybrid a pure white flower of perfect shape with chrome-yellow disc to the lip.

Other Exhibits.

Pantia Ralli, Esq.: *Vanda luzonica*, Ashtead Park variety, with a spike of fourteen white flowers with mauve lip.

Messrs. Charlesworth: *Sophrolaeliocattleya* × 'Prince Hirohito' var. 'Vesuvius' and other hybrids.

ORCHID COMMITTEE, OCTOBER 30, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and twenty members present.

Awards Recommended:—*Award of Merit.*

To *Odontonia* × 'Philosopher' (*M.* × 'St. Andre' × *Odm.* × *Harwoodii*) (votes 15 for), from H. T. Pitt, Esq., Rosslyn, Stamford Hill. Flowers Odontoglossum-like, yellow evenly spotted with chocolate purple.

To *Sophrolaeliocattleya* × 'Pervanch' (*C.* × 'Syros' × *S.-l.-c.* × 'Marathon') (votes 13 for, 4 against), from H. T. Pitt, Esq. A near ally of the *S.-l.-c.* × 'Marathon' parent. Sepals and petals rosy, mauve shaded with gold, lip ruby-purple with yellow disc.

To *Brassolaeliocattleya* × 'Floss Flora' (*S.-l.-c.* × 'Soulange' × *B.-c.* × 'Ilene') (votes 13 for, 6 against), from H. T. Pitt, Esq. Sepals and petals rosy-mauve, lip crimson-purple with yellow disc.

To *Cypripedium* × 'Phantasy' var. 'Sobriety' ('Glorita' × 'Actaeus Bianca') (votes 18 for), from H. T. Pitt, Esq. Flowers yellow, slightly tinged with purple, dorsal sepal white with greenish base.

To *Cattleya* × *Pittportia* var. 'Lady Leon' (*C.* × 'Mrs. Pitt' × *L.-c.* × 'Portia') (votes unanimous), from Sir Herbert Leon, Bletchley Park. Scapes five to seven, flowered. Sepals and petals light purple, lip violet-purple.

To *Laeliocattleya* × 'Profusion' (*L.-c.* × 'Serbia' × *C. Hardiana*) (votes 14 for), from Messrs. McBean, Cooksbridge. A large flower of fine shape. Sepals and petals mauve, lip broad, ruby-purple with yellow base.

To *Odontoglossum* × 'Desdemona II' var. 'Rubens' (*Rossii* × *illustrissimum*) (votes 15 for), from Messrs. McBean. Flowers intermediate in character, the outer segments spotted with dark red, the lip lilac-rose.

Other Exhibits.

Sir Jeremiah Colman, Bt.: cut spikes of hybrids raised at Gatton.

ORCHID COMMITTEE, NOVEMBER 13, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and fifteen members present.

Awards Recommended:—*Silver-gilt Lindley Medal.*

To H. T. Pitt, Esq., Rosslyn, Stamford Hill, for *Odontoglossum* × 'Purple Emperor' ('The Czar' × 'Dusky Monarch') with fine violet-purple flowers. The plant had previously received F.C.C. at Chelsea, May 23, 1922.

Silver Banksian Medal.

To Messrs. Stuart Low, Jarvisbrook, for Cattleyas and Laeliocattleyas.

To Messrs. Cowan, Southgate, for Cypripediums in variety, and Cattleyas.

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First-class Certificate.

To *Odontoglossum* × 'Ithoné' ('Aglaon' × 'Dusky Monarch') (votes unanimous), from Messrs. Charlesworth. A large flower of good shape, blotched with purple and with two ovate silver-white blotches in each segment.

Other Exhibits.

Messrs. McBean, Cooksbridge : hybrids.

Messrs. Sanders, St. Albans : *Brassocattleya* × 'Boadicea' and other hybrids.

Messrs. Charlesworth, Haywards Heath : *Vuylstekeara* × 'Edna.'

Messrs. Armstrong & Brown, Tunbridge Wells : new *Laeliocattleya* × 'Ensign' (*L.-c.* × 'Orion' × *C.* × 'Fabia').

ORCHID COMMITTEE, NOVEMBER 27, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and eleven members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Sanders, St. Albans, for hybrid Cattleyas and Cypripediums with rare species.

First-class Certificate.

To *Cypripedium* × 'Gwen Hannen' ('Florence Spencer' × 'Christopher') (votes unanimous), from G. F. Moore, Esq., Chardwar, Bourton-on-the-Water. A noble flower with dorsal sepal four inches across, white with a band of purple up the middle and some purple lines on the basal half; petals and lip honey-yellow tinged with purple.

To *Cypripedium* × 'Chrysostom' var. 'Amy Moore' ('Christopher' × 'Pyramus') (votes unanimous), from G. F. Moore, Esq. Dorsal sepal four and a half inches in width, white with the basal half tinged with green and bearing purple lines.

To *Cypripedium* × 'Chrysostom' var. 'Richard Fort' ('Christopher' × 'Pyramus') (votes 8 for, 1 against), from G. F. Moore, Esq. Flower large, with purple-spotted lines on the white dorsal sepal; petals and lip yellowish with purple tinge.

To *Cypripedium* × 'Prince Albert' var. 'Mecca' ('Tommycurte' × 'Pyramus') (votes 9 for, 1 against), from G. F. Moore, Esq. Dorsal sepal white with claret-red spotting; petals broad, tinged and spotted with mahogany-red.

Cultural Commendation.

To Messrs. Armstrong & Brown, Orchidhurst, Tunbridge Wells, for a fine plant of *Laeliocattleya* × *Schroederae* var. 'The King' with a spike of seven fine white flowers, with crimson-purple lip.

ORCHID COMMITTEE, DECEMBER 11, 1923.

Sir JEREMIAH COLMAN, Bt., in the Chair, and twenty-one members present.

Awards Recommended :—

Silver-gilt Lindley Medal.

To G. F. Moore, Esq., Chardwar, Bourton-on-the-Water, for hybrid Cypripediums.

Silver Flora Medal.

To Messrs. Sanders, St. Albans, for Cattleyas and other hybrids.

Silver Banksian Medal.

To Mr. H. Dixon, Wandsworth Common, for *Cypripedium insigne Sanderae*.

First-class Certificate.

To *Cypripedium* × 'Gwen Hannen' Chardwar var. ('Florence Spencer' × 'Christopher') (votes unanimous), from G. F. Moore, Esq. A fine flower with broad white dorsal sepal with pale green base and lines of chocolate-purple.

To *Cypripedium* × 'Chrysostom' Chardwar var. ('Christopher Grand Duke Nicholas' × 'Pyramus') (votes unanimous), from G. F. Moore, Esq. A massive flower with white dorsal sepal bearing purple lines, and yellow lip tinged with red.

To *Cypripedium* 'Prince Albert,' Chardwar var. ('Tommycurte' × 'Pyramus' (votes 16 for), from G. F. Moore, Esq. Dorsal sepal heavily marked with reddish-purple, petals and lip tinged brown.

Award of Merit.

To *Cypripedium* × 'Warrior,' H. Green's var. ('Lord Wolmer' × 'Alcibiades') (votes unanimous), from Messrs. Armstrong & Brown, Tunbridge Wells. A finely shaped flower with closely arranged spotted lines of claret colour on white ground on the dorsal sepal.

To *Sophrolaeliocattleya* × 'Eileen,' Low's var. (*S.-l.* × *heatonensis* × *C. Mossiae*) (votes 16 for), from Messrs. Stuart Low. Flowers bright carmine red.

Other Exhibits.

H. T. Pitt, Esq.: rare species.

Flory & Black: selection of hybrids.

Armstrong & Brown: *Cypripedium* × 'Luna.'

Sir Horace Monro: flowers of *Cypripedium insigne* var.

BOOKS PRESENTED, PURCHASED, OR REVIEWED DURING THE YEAR 1923, AND DEPOSITED IN THE LIBRARY.

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10	= " S. Savage, Esq.
11	= " J. B. Stevenson, Esq.

Abbreviations.—cor. = corrected ; il. = illustrations ; introd. = introduction ; pl. or pls. = plates ; col. pls. = coloured plates ; frontis. = frontispiece ; port. = portrait ; enl. = enlarged ; coloph. = colophon ; pref. = preface ; rev. = revised.

AGAR, M. Garden design in theory and practice. [2nd ed. rev.] London, 1913. il. pls. col. pls. 8vo. (1)

AMSTERDAM. Congrès international de botanistes, d'horticulteurs, de négociants et de fabricants de produits du règne végétal . . . en 1877. [Actes, etc.] Leide, 1879. 8vo. (1)

ANDERSON, O. G., and ROTH, F. C. Insecticides and fungicides, spraying and dusting equipment. . . . New York, 1923. il. col. frontis. 8vo. (2)

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ARMSTRONG, D. Winter flowers and how to obtain them. London, 1922. 8vo. (2)

AVERY, M. Six great scientists. London, 1923. ports. 8vo. (2)

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BABINGTON, C. C. Manual of British botany. . . . 10th ed. . . . by A. J. Wilmott. London, 1922. 8vo. (2)

BATARD, [T.J.]. Notice sur les végétaux . . . du jardin des plantes d'Angers. Angers, 1810. 12mo. (1)

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BLATTER, E., and ALMEIDA, J. F. d'. The ferns of Bombay. Bombay, 1922. il. pls. col. pls. 8vo. (2)

BLOMEFIELD, L. A naturalist's calendar kept at Swaffham Bulbeck, Cambridge-shire. 2nd ed. Ed. by Sir FRANCIS DARWIN. Cambridge, 1922. 8vo. (2)

BLONDEL, R. Les produits odorants des rosiers. . . . Paris, 1889. 8vo. (1)

BOCCONE, P. Icones et descriptions rariorum plantarum Siciliae, Melitae, Galliae, et Italiac. . . . [Oxonii] 1674. il. 4to. (1)

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BONPLAND, A. Description des plantes rares cultivées à Malmaison et à Navarre. Paris, 1813. 64 col. pls. fol. (1)

BOSE, Sir J. C. The physiology of the ascent of sap. London, 1923. il. 8vo. (2)

BOWER, F. O. Botany of the living plant. 2nd ed. London, 1923. il. frontis. 8vo. (2)

— The ferns (Filicales). . . . Vol. 1. Analytical examination of the criteria of comparison. Cambridge, 1923. il. frontis. 8vo. (2)

BRITISH MUSEUM (NATURAL HISTORY). Catalogue of the books, manuscripts, maps and drawings. vol. 6. Supplement A-I. London, 1922. 4to. (3)

BROOKE, E. A. The gardens of England. London, [1857]. col. pls. fol. (1)

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BULLER, A. H. R. Researches on fungi. vol. 2. London, 1922. il. 8vo. (2)

BULLETIN DE L'HERBIER BOISSIER, sous la direction de E. AUTRAN. vols. 1-7. Genève, 1893-99. 8vo. (1)

— sous la direction de G. BEAUVERT. 2de série. vols. 1-8. Genève, 1900-1908. 8vo. (1)

See also Mémoires.

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CORREVON, H. Champs et bois fleuris. Neuchâtel et Paris, [1922]. 75 col. pls. 8vo. (2)

COULTER, M. C. Outline of genetics, with special reference to plant material. Chicago, 1923. il. 8vo. (1)

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CURÉ, J. Les jardiniers de Paris et leur culture à travers les siècles. Paris, 1900. 8vo. (1)

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— Our wild flowers and how to know them. London, 1923. il. col. frontis. 8vo. (2)

DALLIMORE, W., and JACKSON, A. BRUCE. A handbook of Coniferae, including Ginkgoaceae. London, 1923. il. pls. frontis. 8vo. (1)

DALMON, J., and GRAS, C. Promenades botaniques dans la flore parisienne. Paris, 1877. 8vo. (1)

DAVIDSON, H. C. Vegetable culture. A practical manual. London, 1922. il. 8vo. (2)

DENDY, A. Outlines of evolutionary biology. 3rd ed. London, 1923. il. 8vo. (2)

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— Descriptions de quelques espèces nouvelles du genre *Rosa*. (Billotia, i.) [Besançon, 1864.] 8vo. (1)

— Revision de la section Tomentosa du genre *Rosa*. (Mém. Soc. Acad. Maine-et-Loire, xx.) Angers, 1866. 8vo. (1)

— Rosiers du centre de la France et du bassin de la Loire. (Bull. Soc. Étud. Sci. Angers, iv et v. 1874 et 1875.) Angers, 1876. 8vo. (1)

— Descriptions et observations sur plusieurs rosiers de la flore française. Fasc. i. (Bull. Soc. Bot. Belg., xix.) Gand, 1880. 8vo. (1)

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DESFONTAINES, R. L. Flora atlantica. . . . Parisiis, [1800]. 2 vols. (in 4). 261 pls. 4to. (1)

— Catalogus plantarum horti regii parisiensis, . . . ed. 3. Parisiis, 1829. 8vo. (1)

DESPORTES, N. Roses cultivées en France, au nombre de 2562 espèces ou variétés, avec la synonymie française et latine. Paris, 1829. 8vo. (1)

DE TOMMASINI, M. Flora dell' isola di Lussino. Con aggiunte e correzioni di C. MARCHESETTI. Trieste, 1895. 8vo. (4)

DICKINSON, J. The flora of Liverpool. Liverpool, 1851. 8vo. (1)

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DODART, [D.J.] Mémoires pour servir à l'histoire naturelle des plantes. . . . Amsterdam et Leipzig, 1758. 38 pls. 4to. (1)

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DONATI, A. Trattato de semplici pietre e pesci marini, che nascono nel lito di Venetia, la maggior parte non conosciuti da Teofrasto, Dioscoride, Plinio, Galeno, ed altri scrittori. . . . Venetia, 1631. il. sm. 4to. (1)

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New York, 1921. il. port. 8vo. (2)

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frontis. 8vo. (2)

DRAKE DEL CASTILLO, E. Flore de la Polynésie française. Paris, 1892. 8vo. (1)

DREVES, J. F. P., and HAYNE, F. G. Choix de plantes d'Europe, décrites et
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DREWITT, F. D. The romance of the apothecaries' garden at Chelsea. London
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DURAND, T., and DE WILDEMAN, É. Matériaux pour la flore du Congo. 5me
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DURHAM, H. E. Perry pears. A collection of photographs taken by H. E.
DURHAM. 1922. 4to. (6)

DYMES, T. A. The nature-study of plants. . . . London, 1920. il. pls.
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EAST, E. M., and JONES, D. F. Inbreeding and outbreeding, their genetic
and sociological significance. Philadelphia and London, 1919. il. pls.
8vo. (2)

ELEY, C. Gardening for the twentieth century. London, 1923. pls. frontis.
8vo. (2)

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FARRER, R. The Dolomites. King Laurin's garden. Painted by E. HARRISON
COMPTON. London, 1913. col. pls. sm. 4to. (7)

FAWCETT, W. A provisional list of the indigenous and naturalised flowering
plants of Jamaica. Kingston, 1893. 8vo. (5)

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FOLGER, J. C., and THOMSON, S. M. The commercial apple industry of North
America. New York, 1921. il. pls. frontis. 8vo. (2)

FREEMAN, E. M. A home vegetable garden. . . . New York, 1922. il. frontis.
8vo. (2)

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GIBSON, R. J. HARVEY. British plant names and their derivations. London,
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GILBERT-CARTER, H. Guide to the University botanic garden, Cambridge.
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1874 et 1875.) Angers, 1876. 8vo. (1)

GODRON, D. A. Flore de Lorraine (Meurthe, Moselle, Meuse, Vosges). Nancy,
1843-44. 3 vols. 12mo. (1)

GOURLAY, J. H. Text-book of pomology. New York, 1922. il. pls. 8vo. (2)

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GUNSTON, H. W., and HAWKES, C. W. Principles and practice of school garden-
ing and connected handicraft. London, 1922. il. frontis. 8vo. (2)

HAAS, P., and HILL, T. G. An introduction to the chemistry of plant products.
London, 1921-22. 2 vols. diagrs. 8vo. (2)

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HALLER, A. VON. Enumeratio methodica stirpium Helvetiae indigenarum.
. . . Gottingae, 1742. 2 vols. (in 1). 24 pls. fol. (1)

— Icōnes plantarum Helvetiae, ex ipsius historia stirpium helveticarum denuo
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HEDRICK, U. P. Cyclopedia of hardy fruits. New York, 1922. il. col. pls.
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HENRY, A. A list of plants from Formosa, etc. (Trans. As. Soc. Japan, xxiv.
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HOPKIRK, T. Flora glottiana. . . . Glasgow, 1813. 8vo. (1)

HOWARD, A. L. A manual of the timbers of the world, their characteristics
and uses. London, 1920. il. 8vo. (2)

HUMPHREY, N. Planning the suburban garden. London, 1922. pls. frontis.
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JACQUIN, N. J. Hortus botanicus vindobonensis. . . . Vindobonae, 1770-76.
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— Icōnes plantarum rariorū. Vindobonae, 1781-93. 3 vols. 649 col.
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JACQUIN, N. J. *Oxalis. Monographia iconibus illustrata.* Viennae, 1794. 81 pls. (mostly col.). 4to. (1)

— *Fragmenta botanica.* . . . Viennae, Austriae, 1809. 138 col. pls. fol. (1)

JAUME SAINT-HILAIRE, J. H. *Plantes de la France, décrites et peintes d'après nature.* Paris, [1805]-1822. 10 vols. (in 9). 1000 col. pls. 10 ports. la. 8vo. (1)

JOHNSON, S. C. *Flowering shrubs and how to know them.* London, 1922. pref. il. 12mo. (2)

JONES, W. NEILSON, and RAYNER, M. C. *A text-book of plant biology.* London, 1920. 1l. 8vo. (2)

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KENNEDY-BELL, M. G. *The glory of the garden.* London, 1923. col. frontis. 8vo. (2)

LA BILLARDIÈRE, J. J. DE. *Sertum austro-caledonicum.* Parisis, 1824-25. 2 pts. 80 pls. 4to. (1)
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LANGE, J. *Descriptio iconibus illustrata plantarum novarum vel minus cognitum, praecipue e flora Hispanica, adjectis pyrenaicis nonnullis.* Hanniae, 1864-[66]. 35 col. pls. fol. (1)

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MARTINEAU, A. *The herbaceous garden.* 4th impression. rev. and enl. London, 1923. pls. col. pls. plans. 4to. (2)

MARTYN, J. *Methodus plantarum circa Cantabrigium nascentium.* Londini, 1727. sm. 8vo. (1)

MAXWELL, Sir H. *Memories of the months.* 7th series. London, 1922. ports. 8vo. (1)

MEEHAN, T. *The native flowers and ferns of the United States.* . . . Boston and Philadelphia, 1878-80. Ser. 1 and 2. [4 vols. in 2.] col. pls. 4to. (1)

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 PINNEY, B., Durweston. Raspberry 'Edmundsbury' for trial.
 POULSEN, D. T., Copenhagen, Denmark. Roses for trial.
 PRICE, E. A., Chepstow. Pinks for trial.
 PRIESTNER, C., Baguley. Chrysanthemum 'Jeannie' for trial.
 PROCTOR, Messrs., Chesterfield. Roses, Chrysanthemums for trial.
 PUDOR, O. M., Washington, U.S.A. Delphiniums for trial.
 PULMAN, Mrs., Bisley. Trees of Apple 'Profit' for trial.
 PYE, F., Lymington. Seedling Pink and Carnation for trial.
 PYNE, G., Topsham. Raspberries for trial.
 RICHARDSON, R. E., Gateshead. Brussels Sprouts for trial, collection of Primula seeds.
 RIVERS, Messrs., Sawbridgeworth. Buds of Cherries.
 RIVOIRE PÈRE & FILS, Messrs., Lyon, France. Wallflowers, Sweet Williams for trial.
 ROBERTS, H., Oxted. Kale for trial.
 ROBINSON, Messrs., Baguley. Cucumber 'Perfection' for trial.
 ROGERS, R. B., Hexworthy. Seeds *Gloriosa Rothschildiana*, roots from Uganda and Kenya, seeds of *Cydonia* 4120 Wilson and Hippeastrums.

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RONSHEIM & MOORE, Messrs., London. 'Germisan' for seed treatment.
ROSENHEIM, P., E. Molesey. Collection of seeds.
ROSS OF BLADENSBURG, Sir JOHN, Rostrevor. Collection of seeds.
ROWLANDS, Messrs., Liverpool. Brussels Sprouts, Borecole for trial.
RUSSELL, Miss F., Shere. Seeds from Abyssinia.
RUYS, Messrs., Dedemsvaart, Holland. Delphiniums for trial.
SAMUEL, W., Wrexham. Delphiniums for trial.
SCANDINAVIAN SEED CO., & R. WIBOLTT LTD., Denmark. Cucumber, Carrots,
Brussels Sprouts for trial.
SCARLETT, J. W., Musselburgh. Brussels Sprouts, Wallflower 'Select Vulcan'
for trial.
SCHEUERMER, F., London. 'Rapid' for destruction of vermin.
SCOTT & WICKHAM, Messrs., Witley. Chrysanthemum 'Phoenix' for trial.
SHACKLOCK, Miss G. F. M., London. Leaves of *Tolmiea Menziesii*.
SIENA BOTANIC GARDEN, Italy. Collection of seeds.
SIMPSON, Messrs. W. H., Birmingham. Runner Beans, Cucumbers, Kales,
Onions, Vegetable Marrows, Carrots, Wallflowers, Sweet Williams, Chrys-
anthemums, Schizanthus, Larkspurs for trial.
SMITH, S., Llangoed, Anglesey. Schizanthus for trial.
SMITH, T., Cape Town. Gladioli from the Victoria Falls and South African
seeds.
SMITH, T., Stranraer. Rose 'Mrs. Tom Smith' for trial.
SPURR, J. B., Aurora, Canada. Seed of Aster 'Aurora' scintillata.
STARK, Messrs., Great Ryburgh. Tropaeolums, Sweet Peas, Poppy 'Ryburgh
Hybrids' for trial.
STEVENSON, J., Wimborne. Sweet Peas for trial.
STERN, F. C., Goring-by-Sea. *Prunus humilis*, *Gentiana Purdomii*, miscellaneous
seeds.
STILES, E. W., Ealing. *Geranium maculatum*.
STORRIE & STORRIE, Messrs., Glencarse. Grafts of Apple 'Cutler Grievé.'
STRAWSON CHEMICAL CO., London. Banding grease for trial.
STREET, H., Bisley. Roses for trial.
TAIT, Mrs. H. C., London. Collection of New Zealand seeds.
TAYLOR, Messrs. A. & C., Somercotes. Border Carnations for trial.
TAYLOR, G. M., Portobello. Black Currant cuttings, grafts of Apple 'Redcoat
Grieve,' *Tradescantia virginica* f. pl.
TEBBS, Mrs., Ryde. Kashmir Roses.
TESCHENDORFF, V., Sachsen, Germany. Rose 'Eva Teschendorff' for trial.
THE LAKELAND NURSERIES, Windermere. *Schizanthus Brownii* for trial.
THE O'MAHONY, Aughrim. Bulbs of 'Straffan' Snowdrops.
THODAY, P., Stoke Bishop. Dahlias for trial.
THOMPSON & MORGAN, Messrs., Ipswich. Delphiniums for trial.
THORPE, A. W., Lichfield. Chrysanthemums for trial.
THYNE, Messrs., Dundee. Chrysanthemum 'Mary Colvin' for trial.
TOOGOOD, Messrs., Southampton. Sweet Peas, Tropaeolums, Kales, Brussels
Sprouts, Carrots, Onions, Climbing Beans, Schizanthus for trial.
TRESEDER, Messrs., Cardiff. Dahlias 'F. Graham Bird' and 'Nanno' for trial.
TRINDER, G., Fleet. Delphiniums for trial.
TUCKER, R. K., Headington. Delphinium 'Blue Bird' for trial.
TURBAT, Messrs., Orleans, France. Roses for trial.
TURNER, C., Slough. Dahlias, Pinks, Delphiniums for trial.
UNWIN, W. J., Histon. Sweet Peas, Brussels Sprouts, Climbing Beans, Sweet
Williams for trial.
UPPSALA BOTANIC GARDEN, Sweden. Collection of seeds.
VAN DE WEYER, W. J. B., Corfe Castle. Portuguese Thrift.
VAN ROSSEM, G. A., Naarden, Holland. Roses for trial.
VAN TUBERGEN, C. G., Haarlem, Holland. Anemone 'St. Bavo Mixed,' *Cyclamen
ciliicicum*, *Eranthis Tubergeni*, *Ixiolirion Ledebouri*, Tulip species for
trial.
VEITCH, Messrs. R., Exeter. Tropaeolums, Sweet Peas, Onions, Kale, Cucumbers,
Vegetable Marrows, Carrots, Beans, Brussels Sprouts, Wallflowers, Sweet
Williams, Annual Larkspurs, Schizanthus, *Tulipa praecox* for trial.
VILMORIN-ANDRIEUX & CIE, Paris. Collection of seeds.
VILMORIN, J. de, Loviet, France. Collection of seeds.
WADE, J., Acton. Seed of *Mimulus moschatus* (Seedlings not scented).
WALLER SEED CO., Guadalupe, U.S.A. Sweet Pea, Schizanthus, Larkspurs for
trial.
WARBURG, Capt. O. E., Epsom. Various Cistuses for trial.
WARNER, H. H., Hoddesdon. Seeds of *Gladiolus tristis* and Ifafa Lily Hybrids.

WATERER, P., Ludgvan. *Eupatorium petiolare*.

WATKINS & SIMPSON, Messrs., London. Climbing Beans, Cucumbers, Vegetable Marrows, Onions, Brussels Sprouts, Carrots, Tropaeolums, Wallflowers, Sweet Williams, Schizanthus, Annual Larkspurs for trial.

WEBB, Messrs., Stourbridge. Wallflowers, Sweet Williams, Schizanthus, Larkspurs for trial.

WEBBER, Messrs., Plymouth. Chrysanthemums for trial.

WETTERN, H. L., Oxted. Cuttings of Rose species.

WHEATCROFT, Messrs., Gedling. Rose 'Mrs. G. A. Wheatcroft' for trial.

WHEELER, Messrs., Gloucester. Schizanthus 'Large-flowered hybrids' for trial.

WHEELER, Messrs., Warminster. Brussels Sprouts for trial.

WILLIAMS, J. C., Gorran. Collection of Forrest's Rhododendron seeds.

WILLIAMS, M., London. Gentians from Italian side of Alps, Eritrichium.

WILLIAMS, P. D., St. Keverne. Collection of Rhododendron and other seeds.

WOOD, F. G., Ashtead. Helianthemums for trial.

WOODALL, E. H., Brancolar, France. Seed of *Sophora secundiflora*, bulbs of *Leucocarpus nicaeense*.

WOODBURN, A. F., Emsworth. Grafts of Apple 'Jeanne Hardy.'

YATES, Messrs., Cheltenham. Seed 'Pride of Barbados.'

YATES, Messrs., Evesham. Vegetable Marrow for trial.

ZWAAN & DE WILJES, Messrs., Scheemda, Holland. Cucumbers, Kales, Tropaeolum, Brussels Sprouts, Carrots for trial.

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